

BLM LIBRARY



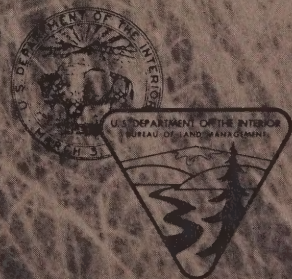
88077714

FORT UNION COAL

CENTRAL BLOOMFIELD TRACT

SEPTEMBER 1981

TD
195
.C58
C463
1981



17910724

ID: 88077714

TD
195
.C58
C463
1981

FORT UNION COAL REGION

CENTRAL BLOOMFIELD TRACT ANALYSIS

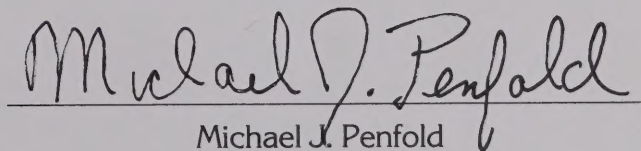
SITE SPECIFIC ANALYSIS

PRELIMINARY FACILITY EVALUATION REPORT

DAWSON COUNTY, MONTANA

BLM Library
Denver Federal Center
Bldg. 85, OC-521
P.O. Box 25047
Denver, CO 80225

September 1981



Michael J. Penfold
State Director

PREFACE

This document contains a site-specific analysis and a preliminary facility evaluation report. The site-specific analysis discusses the consequences of leasing and mining a particular tract. The preliminary facility evaluation report discusses significant issues associated with an end use coal conversion facility.

There were 24 tracts identified through a screening process under the over-all direction of the Fort Union Region Coal Team. The team consists of federal, state, and local officials. The tracts are being evaluated for potential federal coal leasing for a coal lease sale scheduled for June 1983. The evaluation, called a site-specific analysis, has been completed for each of the 24 tracts.

Historically, development of a new coal mine in the Fort Union Coal Region has been associated with a coal conversion facility power plant in the vicinity of the mine. For this reason, the Regional Coal Team directed BLM to evaluate impacts of a typical facility near each potential mine. A preliminary facility evaluation report was prepared for each facility.

The Fort Union Regional Coal Team will begin ranking and grouping selected tracts into alternative leasing patterns for the 1983 lease sale using information from these individual reports. These groupings of tracts will form the basis for alternatives and a regional environmental impact statement to be developed during 1982. The analysis in this report represents an important step in a lengthy process which takes place prior to any final decision on federal coal leasing within the region.

Of the 24 tracts currently being evaluated, 16 would require the opening of new mines. One of the 16 would be specifically earmarked for small business. The remaining eight tracts constitute coal which would be needed to maintain production or prevent the by-pass of federal coal at an ongoing mining operation.

Approximately 1.6 billion tons of recoverable federal coal lie within the areas being evaluated. Final designation of some areas as unsuitable for mining under the 1977 Surface Mining Control and Reclamation Act will likely reduce the amount of federal coal actually available for leasing and development, and could remove several of the 24 tracts from further consideration. This information will not be available until early 1982.

A major purpose of the site-specific analysis and preliminary facility evaluation reports is to acquaint the public with key issues and consequences of leasing and development of federal coal reserves so that they may (1) offer comments to the Fort Union Regional Coal Team on what areas they consider most important to be evaluated and analyzed in the ranking of the tracts and in the Regional EIS and (2) offer specific advice on what decision alternatives the Coal Team should look at more closely.

CONTENTS

Site Specific Analysis

Introduction	1
Chapter I — Alternatives	5
Chapter II — Affected Environment	7
Chapter III — Environmental Consequences	17
References	29
Summary Matrix	31
Unsuitability Criteria Results	37

Preliminary Facility Evaluation Report

Goals and Objectives	41
Part One — Assumptions and Variables	41
Part Two — Relationship of Tract and Facility	46

INTRODUCTION

The purpose of this report is to provide a detailed description of the site and its surroundings, including the location, size, and shape of the site, and the nature of the surrounding land use.

The site is located in the center of the city, and is surrounded by residential and commercial buildings. The site is approximately 100 feet wide and 200 feet deep.

The site is currently used as a parking lot, and is surrounded by a concrete wall. The site is in good condition, and is suitable for development.

The site is located in the center of the city, and is surrounded by residential and commercial buildings. The site is approximately 100 feet wide and 200 feet deep.

The site is currently used as a parking lot, and is surrounded by a concrete wall. The site is in good condition, and is suitable for development.

SITE SPECIFIC ANALYSIS

THE SITE

The site is located in the center of the city, and is surrounded by residential and commercial buildings. The site is approximately 100 feet wide and 200 feet deep.

The site is currently used as a parking lot, and is surrounded by a concrete wall. The site is in good condition, and is suitable for development.

THE SITE

The site is located in the center of the city, and is surrounded by residential and commercial buildings. The site is approximately 100 feet wide and 200 feet deep.

The site is currently used as a parking lot, and is surrounded by a concrete wall. The site is in good condition, and is suitable for development.

FACT OR OPINION REPORT

FACT

The site is located in the center of the city, and is surrounded by residential and commercial buildings. The site is approximately 100 feet wide and 200 feet deep.

The site is currently used as a parking lot, and is surrounded by a concrete wall. The site is in good condition, and is suitable for development.

The site is located in the center of the city, and is surrounded by residential and commercial buildings. The site is approximately 100 feet wide and 200 feet deep.

The site is currently used as a parking lot, and is surrounded by a concrete wall. The site is in good condition, and is suitable for development.

INTRODUCTION

The purpose of this action is to offer strippable federal coal reserves that can be further considered for coal leasing and development to help meet the energy needs of the nation.

This site specific environmental analysis has been prepared for the Central Bloomfield tract (see Map 1) in accordance with federal regulations (43 CFR 3420). It will be used by the Fort Union Regional Coal Team to further consider competitive leasing of federal coal within the tract for a June 30, 1983, coal lease sale schedule. If selected and leased, the Central Bloomfield tract will contribute 105.1 million tons of federal coal to the regional leasing target. Presently, a regional leasing target has not been established by the Secretary of the Interior. The preliminary regional leasing target will be established in August 1981 and finalized in October 1981.

BACKGROUND

In September of 1979, the Miles City District BLM Office completed the Redwater Management Framework Plan (MFP) for Dawson, McCone, Richland and Wibaux counties. The land use planning process included applying unsuitability criteria as much as possible, multiple-use conflict evaluation, and surface owner consultations. As a result of that work, areas were identified that could be further considered for coal development. The areas are available for consideration for new competitive leasing, leasing by exchanging and modifying existing leases (see Map 1).

Following land-use planning, the BLM requested expressions of leasing interest which, along with other information, guided the USGS in delineating this tract. Results of that work are summarized in this profile.

Personnel from BLM's Miles City District inventoried the tract to determine the site specific resource values and then analyzed potential environmental effects of coal development on this individual tract. Among other items, the unsuitability criteria (43 CFR 3461) were reconsidered on this site-specific basis. Any new findings of unsuitability are reflected in this report.

To be further considered for new competitive leasing, the Regional Coal Team will rank and select tracts for a proposed lease sale schedule. The proposed lease sale tracts are then analyzed in a regional environmental impact statement (EIS). The EIS will analyze the site-specific and regional cumulative effects of coal leasing and development. Alternatives addressed in the EIS will include different combinations of tracts that meet a regional coal leasing target. The analysis of those groups of tracts could result in different impacts than the assessment made in this document for this specific tract. During the process this preliminary tract could be

modified. Ultimately, the Secretary will select specific tracts for lease sale. If the tract is leased, the lessee will be required to submit a plan for mining and reclamation to the Secretary of the Interior, Office of Surface Mining (OSM) for review and approval within three years after leasing. Once a mining plan has been submitted, OSM will review the proposed developments of the mining plan. OSM will prepare a site-specific environmental assessment or EIS prior to approval of the mining plan.

Development of the tract is in accordance with the federal coal management program adopted by the Secretary of the Interior in June 1979. Basis of the program was, in part, the Final Environmental Statement for the Federal Coal Management Program. Implementation procedures are contained in Title 43 - Code of Federal Regulations - Part 3400 (43 CFR 3400). Authorizing actions are The Mineral Leasing Act of 1920, as amended; The Mineral Leasing Act for Acquired Lands of 1947, as amended; the Federal Land Policy and Management Act of 1976; the Surface Mining Control and Reclamation Act of 1977; the Multiple Mineral Development Act of 1954; the Department of Energy Organization Act of 1977; the National Environmental Policy Act of 1969; the Federal Coal Leasing Amendments Act of 1976; as amended; and federal regulations concerning federal coal leasing and development including 43 CFR 3400; 30 CFR 211; and 30 CFR 700-899.

TRACT DELINEATION REPORT SUMMARY

The Central Bloomfield tract is located in the Great Plains physiographic province and lies approximately six miles north of Bloomfield and ten miles south of Richey in northern Dawson County, Montana. The tract contains one economical recoverable seam (the Pust bed) of lignite coal.

The seam divides into two benches, an upper thick one, and a lower bench which has one or more partings. The seams range from 14 to 30 feet thick, with overburden ranging from less than 150 feet to 200 feet in depth. There are no known geological hazards to surface mining in the Central Bloomfield tract.

The generic mine plan calls for a surface mine using draglines, electric shovels, bottom-dump coal haulers, scrapers and other support equipment. A possible mining sequence for analysis purposes is shown on Map 2. The coal would thus be mined to a depth of 200 feet or until the limiting stripping ratio (20:1) has been reached. The plan indicates the most probable use of the coal would be an on-site electrical generation plant.



PRELIMINARY TRACTSRedwater and Golden Valley

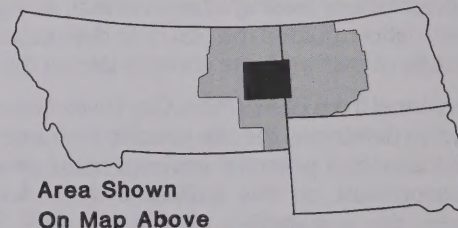
 KRCRA Areas

 Tract Delineation Areas

Total Ft. Union Coal Region

- 1 Circle
- 2 Burns Creek-
Thirteen Mile Creek
- 3 Southwest Glendive
- 4 Wibaux-Beach

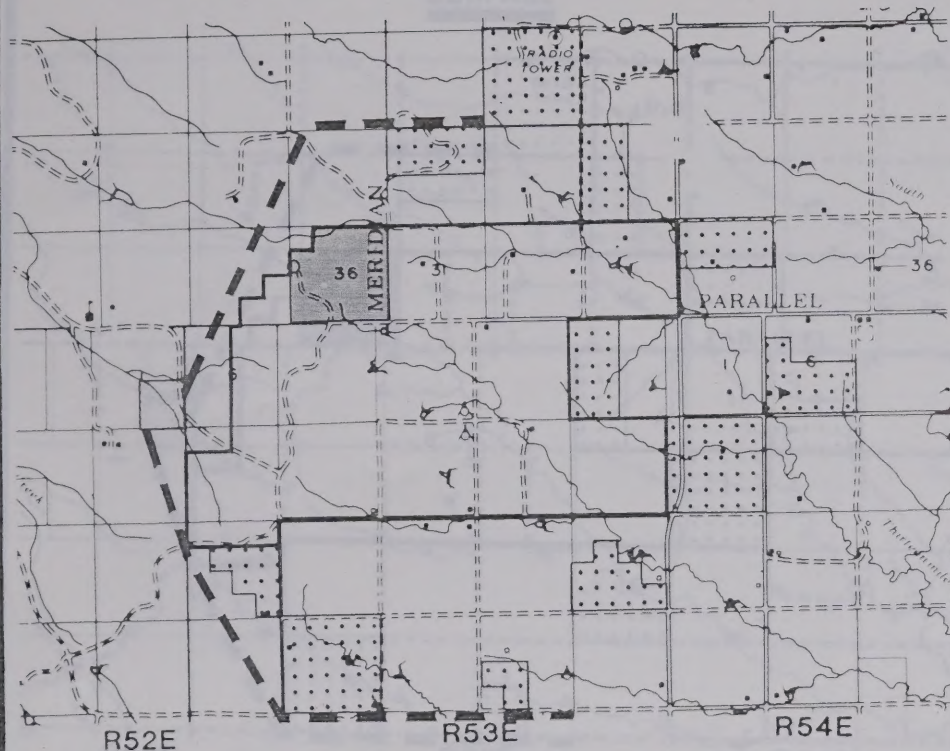
- 1 Circle I
- 2 Circle II
- 3 Circle III
- 4 Redwater I
- 5 Redwater II
- 6 Southwest Glendive
- 7 Bloomfield
- 8 Central Bloomfield
- 9 Burns Creek
- 10 North Wibaux-Beach
- 11 South Wibaux-Beach



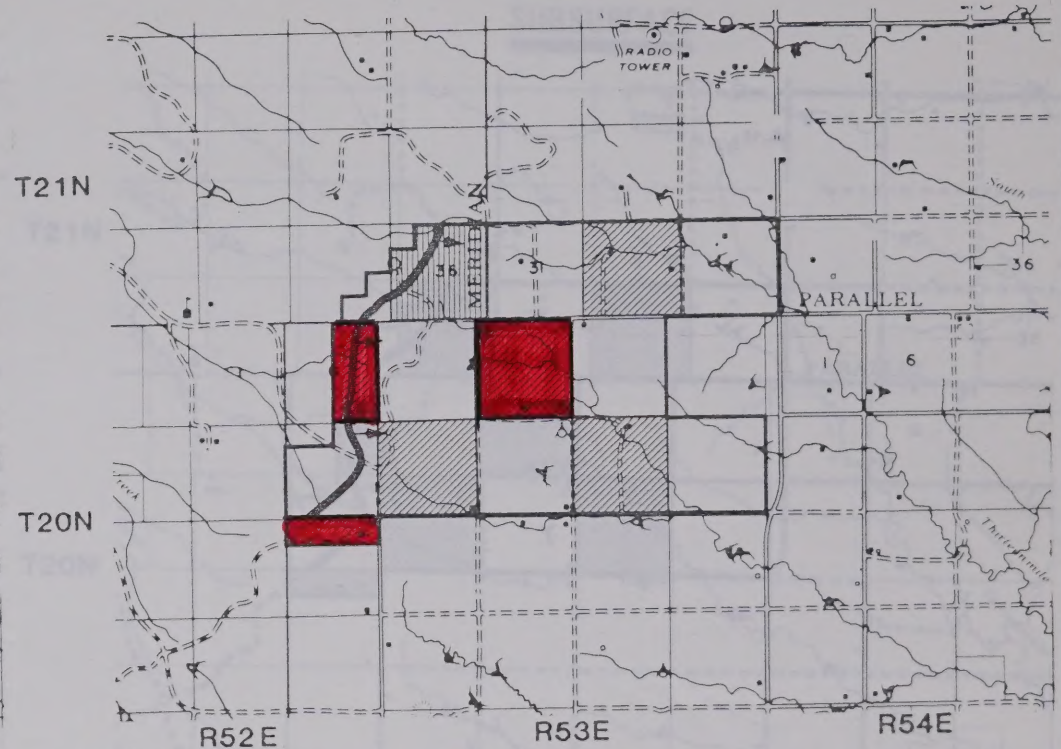
★ Savage Mine

CENTRAL BLOOMFIELD TRACT

SURFACE



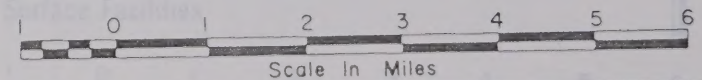
SUBSURFACE



LEGEND

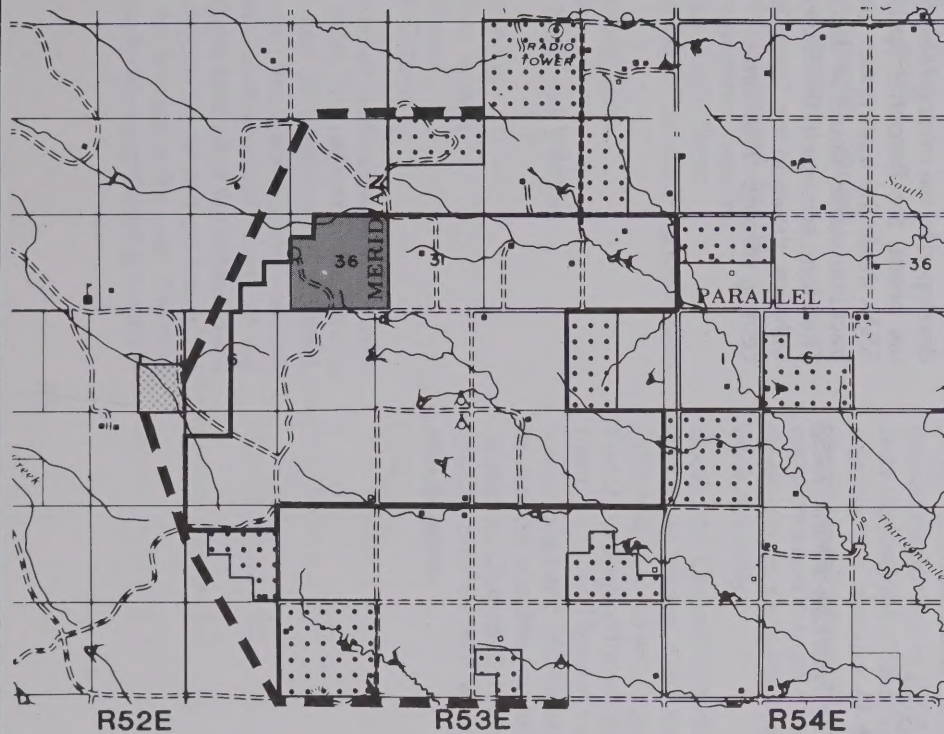
- | | | | |
|---|---------------------------|---|--------------|
|  | State Surface |  | Federal Coal |
|  | Private Surface |  | State Coal |
|  | Tract Boundary |  | Private Coal |
|  | Surface Owner Nonconsents | | |

- | | |
|---|-----------------------|
|  | Out-of-Pit Haul Roads |
|  | Pit Advancement |
|  | Surface Facilities |

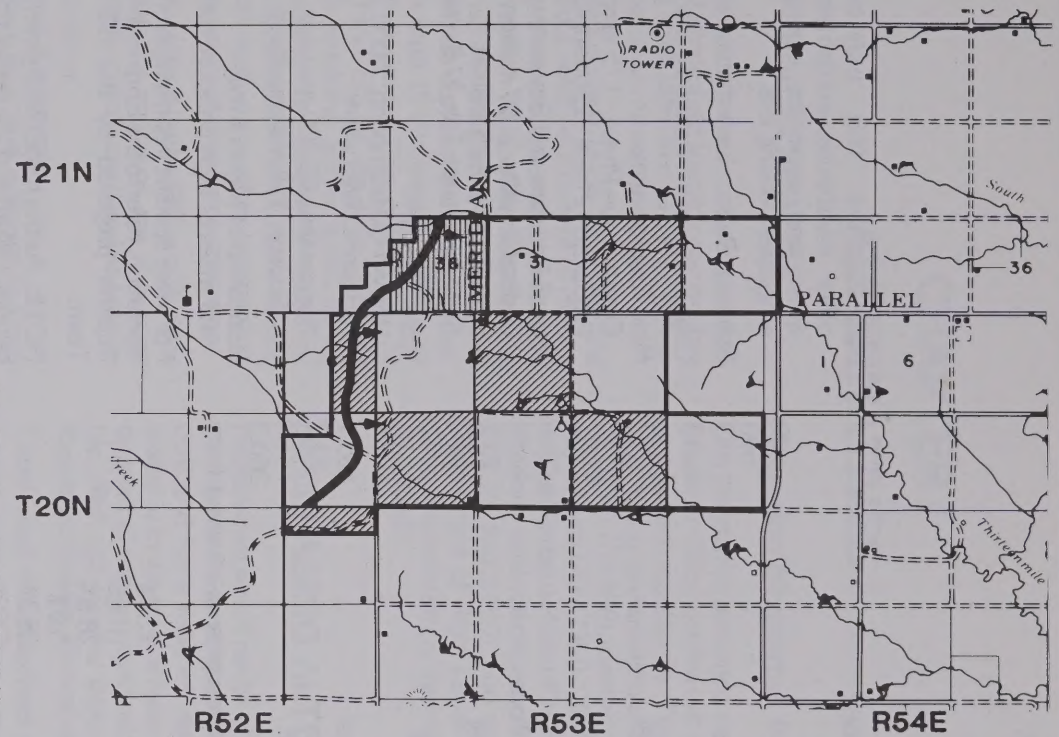


CENTRAL BLOOMFIELD TRACT

SURFACE

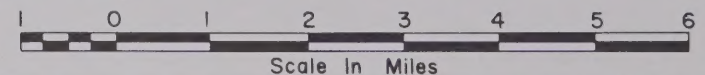


SUBSURFACE



LEGEND

- | | | | | | |
|---|---------------------------|---|--------------|---|-----------------------|
|  | State Surface |  | Federal Coal |  | Out-of-Pit Haul Roads |
|  | Private Surface |  | State Coal |  | Pit Advancement |
|  | Tract Boundary |  | Private Coal |  | Surface Facilities |
|  | Surface Owner Nonconsents | | | | |



SITE SPECIFIC ANALYSIS

Specific Tract Characteristics:

Acreage:		
Surface:	Federal	0
	State	600
	Private	7,613
	Total:	8,213
Coal:	Federal	3,065
	State	600
	Private	4,547
Total		8,213
Coal Reserves/Millions of Tons:		
In Place:	Federal	116.8
	State	15.2
	Private	157.2
	Total	289.2
Recoverable:	Federal	105.1
	State	13.7
	Private	141.5
	Total:	260.3

Coal Quality: Average of samples as received from vicinity of tract:

Moisture	32.4%
Ash	10.6%
Volatile matter	28.6%
Sulfur	0.9%*
Fixed carbon	28.3%
BTU's/lb	6,698

*Contained microveins of pyrite

Surface Disturbance/acres

Mining: Annual rate, 187.0; Total Life of Mine, 7,468

Haul Roads: 135

Mine Facilities: 160 - may include: changehouse, office warehouse, equipment repair shops, fuel, water and explosive storages, equipment and employee parking lots.

Stripping Ratio: Less than or equal to 20 to 1

Coal Thickness: Range 14 ft. to 27 ft.; average, 22.12

Mine Employment:

Construction Phase - 175 employees

Production Phase - 230 employees (maximum)

Annual Royalties and Severance Taxes:

Federal Royalty, \$1.97 million

State Royalty, \$.26 million

State Severance Tax, \$7.8 million.

Water Needs:

Human Consumption, 7,000 gal./day

Source: Well water

Nonpotable, 60,000 gal./day

Source: Yellowstone River

Relocation of Right-of-Way:

4.5 miles of high pressure natural gas pipeline

For more specific information on the proposed mining operation, refer to the Engineering, Geologic and Land Reports prepared by the USGS Tract Delineation Team.

NOTE: As the mine plans developed by USGS are of a generic nature and the actual mining sequence will be developed by the mining companies to fit their individual needs, the Resource Specialist assigned to the SSAs made the assumption that all lands within the tract boundaries would be disturbed to some degree. Therefore, acreage in the SSA may not always agree with that shown in the Tract Delineation Report concerning acreage disturbance.

CHAPTER I

ALTERNATIVES

LEASING AND DEVELOPMENT

This alternative is to offer for further consideration federal coal in the Central Bloomfield tract for competitive leasing. This tract has been identified as a logical mining unit for a 40-year surface mining operation.

The tract does not include any lands for which the surface owner has filed a valid nonconsent to mining prior to March 1, 1981. Unsuitability criteria numbers 1, 2, 4 through 6, 8, 16 through 18, and 20, as defined in the federal regulations CFR Subpart 3461, has been fully applied to the private surface over federal coal. Criteria numbers 9 through 15 involving fish and wildlife are pending further study. This criteria will be applied prior to the Final EIS as the data becomes available. Criterion 3 involving buffer zones along rights-of-way and adjacent to dwellings must be resolved prior to mining. Criterion 7 on cultural resources will be cleared through mine plan submission, which will include mitigation or avoidance measures.

Criterion 19 will be determined by the Office of Surface Mining current unsuitability concerns are shown on Map 3. These unsuitability criteria are listed as follows:

- (1) Federal Land System
- (2) Rights-of-Way and Easements
- (3) Buffer Zones along R/W and Adjacent to Communities and Buildings
- (4) Wilderness Study Areas
- (5) Scenic Areas
- (6) Lands Used for Scientific Studies
- (7) Historic Lands and Sites
- (8) Natural Areas
- (9) Federally Listed Endangered Species
- (10) State Listed Endangered Species
- (11) Bald and Golden Eagle Nests
- (12) Bald and Golden Eagle Roost and Concentration Areas
- (13) Falcon Cliff Nesting Sites
- (14) Migratory Birds
- (15) State Resident Fish and Wildlife
- (16) Floodplains
- (17) Municipal Watersheds
- (18) National Resource Waters
- (19) Alluvial Valley Floors
- (20) State Proposed Criteria

The tract contains two small inactive mines which went out of production in 1968. The nearest active mine is the Savage mine located 20 miles east of the tract. Production of the Savage mine is about 0.3 million tons annually. The tract lies on the western flank of the Williston Basin oil and gas field. All of the federal lands within the tracts are subjected to oil and gas leases. No active leases or wells are located in the tract. Farming and ranching are the only other significant activities in or near the tract.

Mitigation Measures

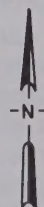
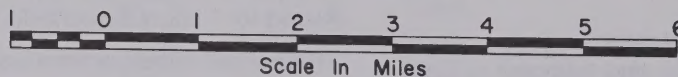
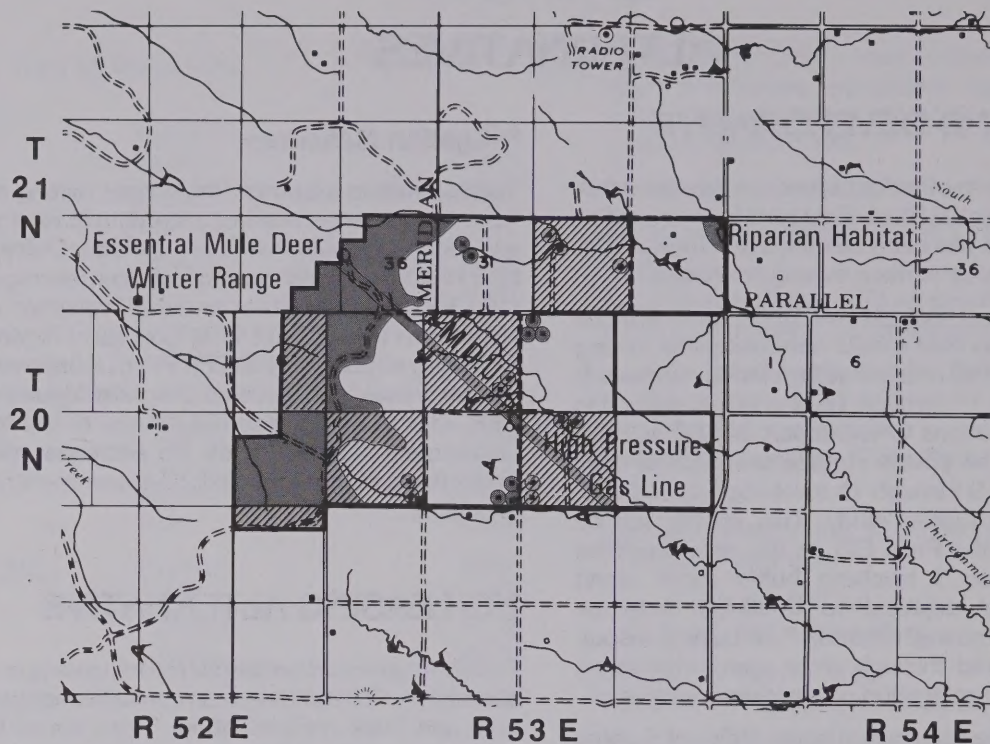
This alternative assumes that proper mining and reclamation will be carried out according to existing state and federal regulations. These include: Office of Surface Mining Reclamation and Enforcement regulations (30 CFR 700-899), Environmental Protection Agency regulations (40 CFR 0-1399), Council of Environmental Quality regulations (40 CFR 211), Department of the Interior's coal management program regulations (43 CFR 23 and 3400), and regulations of the Montana Department of State Lands. No additional mitigation under the authority of the federal government has been identified.

NO LEASING ALTERNATIVE

Federal coal would not be offered for leasing under this alternative. Federal reserves represents about 40 percent and State reserves about 5 percent of the coal available in the tract. If federal coal is not leased, development of a large economical mining unit is not feasible. (Ref. GS Central Bloomfield PLMU Engineering Report for Central Bloomfield.)

Three small mines located just east of the tract are no longer active and two small mines within the tract ceased production in 1968. There were no small business expressions of leasing interest for the area. Considering the amount of federal coal involved, the checkerboard pattern of federal coal ownership and the apparent trend in small mine development, near future development of any small coal mines in the tract boundary is not likely.

Should the Central Bloomfield tract not be considered for further leasing, there would be about 7 percent or (105 million tons) less federal coal available within the Fort Union Region for consideration in tract selection to meet the federal leasing target. Also about 14 million tons of State and 142 million tons of private coal would be lost for possible production in the region. As discussed in Chapter II, few significant changes to the existing environment would be expected during the next 40 years.



CENTRAL BLOOMFIELD TRACT

LEGEND

Areas that may be declared unsuitable for surface mining based on existing information.

-  By BLM
-  By Others
-  Federal Coal
-  Potential Dwellings

CHAPTER II

AFFECTED ENVIRONMENT

This section is a description of the current environment with anticipated changes from ongoing trends. Within the Williston Basin there has been an increase in oil and gas exploration and this trend is expected to continue. The physical resources described in this section represent only existing conditions while the social and economic sections account for existing conditions and ongoing trends. It is recognized that the physical resource values may change due to future oil and gas exploration.

TOPOGRAPHY

Surface expression varies from breaks and badlands on the western edge of the tract to gently rolling crop and grassland interrupted by an occasional butte in the remainder of the area. See Figure 1. Elevations range from 2660 feet to 3025 feet. Drainage is toward the east through tributaries of Thirteen Mile Creek.

GEOLOGY

The area is underlain by sandstone, shale, and lignite beds belonging to the Tongue River Member of the Fort Union Formation (Paleocene). Some of the higher divides in the area are capped by Flaxville Gravel (Miocene/Pliocene).

Although no discoveries of other minerals have been made within the tract, the area is underlain by formations that are prospectively valuable for oil and gas. No other mineral values are known to occur within the tract.

SOILS AND RECLAMATION POTENTIAL

Soils within the tract are formed in weakly consolidated sandstone, alluvium and glacial till. The soils occur along steep, dissected sedimentary plains, undulating and hilly sedimentary plains and nearly level to rolling high terraces on uplands. Profile development and depths vary due to climate, parent material and geomorphic stability.

There are 29 soil series in the tract surveyed by the Soil Conservation Service at level two. Table 1 identifies erosion potential, soil reconstruction potential, etc. for soils within the tract.

HYDROLOGY

Surface Water

The tract is drained principally by Thirteen Mile Creek and an unnamed tributary to Thirteen Mile Creek (see Map 2), both of which have only intermittent flow (estimated to occur 30 days or less per year). Thirteen Mile Creek is a tributary to the Yellowstone River, about 22 miles southeast of the eastern Central Bloomfield tract boundary. Flow and flood peaks result from summer thunderstorms and from snowmelt in February through April.

Thirteen Mile Creek drains about 12 square miles upstream of the eastern tract boundary. Its annual yield is estimated to be 220 acre feet (average annual runoff of 0.35 inch) and the peak flow anticipated at least once in a 10-year period is estimated to be 370 cubic feet per second. An unnamed tributary drains the central and southern part of the tract. The estimated annual yield, from about 8 square miles, is 150 acre feet. The peak flow, anticipated at least once in a 10-year period, is 300 cubic feet per second.

Flow in Thirteen Mile Creek and its tributary has not been sampled, but at low flow and estimating from the surrounding areas the water would probably be a sodium-sulfate type with concentrations of dissolved solids about 2,500 milligrams per liter (mg/l) or more depending on the volume of flow. During high flow from storm runoff the dissolved solids content would be 200 to 600 mg/l, probably dominated by calcium and bicarbonate ions. The water is suitable for stock and wildlife and provides tributary inflow to the Yellowstone and ultimately the Missouri Rivers.

Groundwater

The principal aquifers in the tract are the near-surface Tongue River and underlying lower Fort Union, and the more deeply-buried Fox Hills-lower Hell Creek. The major groundwater flow in the near-surface aquifers is to the southeast, toward the Yellowstone River. A small amount of groundwater in the western part of the tract follows surface flow northwestward to the Redwater River. Flow in the Fox Hills-lower Hell Creek aquifer is to the northeast.

Wells inventoried in and near the tract tap only the Tongue River aquifer. Water levels range from 36 to 79 feet below land surface in the inventoried wells, which are 99 and 115 feet deep. Nearby wells in the Tongue River aquifer yield from 3 to 20 gallon per minute



Figure 1. Typical of the gently rolling cropland, this view looks northward toward the center of the tract.

TABLE 1
CENTRAL BLOOMFIELD
SOIL EROSION

SOIL MAPPING UNIT NAME	DEPTH 1/			PERCENT SLOPE	SOIL EROSION POTENTIAL 1/		SURFACE ACRES	PERCENT OF AREA	SOIL 2/ RECONSRT. POTENTIAL	SOIL 2/ HAZARD CONDITIONS	SUITABILITY OF SOIL MATERIAL 3/ FOR GROWTH (ACRE FEET)		
	MODERATELY				WIND	WATER					GOOD	FAIR	POOR
	SHALLOW 0-20"	DEEP 20-36"	DEEP 36+"										
Badlands	X			--	*Mod	High	143	2	Unsuitable	Erosion, slope	--	--	--
Beaverton complex			X	4-15	Low	High	530	7	Poor	Too sandy, droughty	--	753	1897
Cherry silty clayloam, Farnuf loam			X	0-4	Low	Low	893	11	Fair	Excess lime, too clayey	444	4021	--
Cherry-Lambert complex, Lambert gravelly loam			X	4-40	Low	High	201	2	Fair	Excess lime	--	1005	--
Cherry, Havreton and Trembles Soils, occasionally flooded			X	--	Mod	High	136	2	Fair	Excess lime	--	680	--
Farnuf loam, Cherry silty clay loam			X	4-8	Low	Mod	474	6	Fair	Excess lime, too clayey	190	2180	--
Farnuf-Shambo loams, Shambo loam			X	0-4	Low	Low	722	10	Fair	Excess lime	699	2911	--
Farnuf-Shambo loams, Lambert Silt loam, Shambo loam, Shambo-Lambert complex			X	2-8	Low	Mod	2353	28	Fair	Excess lime	1978	9788	--
Lambert silt loam, Shambo- Lambert complex			X	8-15	Low	High	847	10	Fair	Excess lime	258	3946	17
Lambert-Badland complex	X(.40)		X(.60)	20-80+	Mod	High	232	3	Poor	Excess lime, slope	--	654	26
Lambert-Dimyaw complex			X	15-65	Low	High	494	6	Poor	Excess lime, too clayey	--	1418	943
Lambert-Ringling complex	X(.40)		X(.60)	15-65	Low	High	12	<1	Fair	Excess lime	1	38	2
Tally fine sandy loam			X	0-4	High	Mod.	30	<1	Fair	Droughty	75	75	---
Tc Tally fine sandy loam			X	4-15	High	High	271	3	Fair	Droughty	678	678	---
Tinsley-Lambert complex			X	15-65	High	Mod.	661	8	Poor	Excess lime, droughty	7	1381	1917
Tinsley soils			X	15-65	High	Mod.	18	<1	Poor	Too sandy, droughty	--	6	84
Turner loam			X	2-4	Low	Mod.	74	1	Poor	Excess lime, too sandy	30	142	198
Turner-Beaverton loams			X	0-2	Low	Low	91	1	Poor	Too sandy, droughty	29	175	251
Turner-Reaverton loams			X	2-4	Low	Mod.	31	<1	Poor	Too sandy, droughty	10	86	67
TOTALS							8213	100			4399	29937	5402
Soil Depths	Soil Erosion Potential			Soil Reconstruction Potential				Suitability of Soil Material for Plant Growth					
Shallow - 3%	Wind		Water	Good - 0%				Good - 11%					
Mod. Deep - 0%	Low - 82%		Low - 22%	Fair - 72%				Fair - 73%					
Deep - 97%	Mod. - 7%		Mod. - 43%	Poor - 26%				Poor - 13%					
	High - 11%		High - 35%	Unsuitable - 2%				Unsuitable - 3%					

*1% too variable to rate

1/ Soil Depth Classification and Soil Erosion Potential is derived from
Dawson County Soil Survey

2/ Soil Reconstruction Potential is derived from the National Soils Handbook.

* Too variable to rate.

3/ Depth (in acrefeet) of available soil calculated from acres x acrefeet/acre =
suitability of soil material for plant growth.

(gpm). The dissolved solids content of the water range from 2,000 to 3,000 mg/l, dominated by calcium, magnesium, and sulfate ions. Two stock and two domestic wells have been inventoried within the tract and one stock and one domestic well have been inventoried outside but within one mile of the boundary.

LAND USES

Vegetation and Agricultural Production

Agricultural operations in this area consist of: (1) livestock and (2) small grains and livestock. (See Table 2 for land use breakdown on the tract.) Most of the cropland in this area is dry-farmed with small areas being irrigated. A crop-fallow system is used in the dry-farmed area with mainly wheat or barley being grown. Small acreages are used for other small grains, forage crops, potatoes, flax or pasture.

There are 16 agricultural operators who have some or all of their operation within this tract. However, one agricultural operator has no cropland within the tract (see Table 3).

About 21 percent of the total cropland of these operators lies within the tract. This ownership pattern varies greatly by operator. For example, the largest operator has 5,588 total acres with about 8.6 percent of his operation included in the tract while the smallest operator has 320 acres which are entirely within the tract.

Since over 31% of the tract is native vegetation, livestock production is an important part of the agricultural operation. Livestock provide income to farmers by utilizing straw, grain and other crops that are not marketed at the grain elevators. Livestock also graze harvested fields and hay lands on the tract during the off-season. During crop-growing periods, the livestock are moved

to native rangeland pastures either on the tract or off, depending on the operator's situation.

Approximately 503 AUMs of native forage for livestock are produced annually on the tract. Assuming that the hay produced (see Table 2) were fed to livestock, an additional 244 AUMs would be available to upgrade the winter diet of straw, old hay and winter grazing. Winter grazing on the croplands varies tremendously depending on the amounts of moisture (fall rains, winter snowfall) and the degree of chill factor. A warm wet fall followed by a mild snow-free winter may produce as many as 551 AUMs of fall-winter grazing on the tract. Normally only about 200 AUMs are available on the tract for winter grazing, because of the difficulties in providing water for livestock in the winter.

The vegetation on the tract is typically grassland, lying between the Prairie County Grassland type and the Northeastern grassland type (Payne, 1973). Within these two types are the following subtypes: grassland (1819 acres), badlands (494 acres), sagebrush (203 acres), upland hardwoods (46 acres) and riparian shrub (19 acres), totaling 2581 acres of the tract. Much of the native vegetation lies on the west edge of the tract in the Redwater River watershed. The riparian shrub and some grassland stream channels are located on the northeast portion of the tract, which is mainly in the Yellowstone River drainage. Islands of shelterbelt trees and tame pastures are found in the cropland areas. The rough topography of the badlands areas are interspersed with sagebrush, grassy ridges, or woody draws. These vegetative types are important to mule deer and other wildlife.

The impacts of intensive livestock use in the past has impacted the range condition. It is estimated that about half the range is in poor to fair range condition, with the remainder in good condition. (Dawson County Conservation District, 1975)

TABLE 2¹
Agricultural Land Use

Land Use	Tract Acres	Average Production Per Acre	Total Annual Production
Cropland	2,813	28.4 bushels	79,889 bushels
Hayland	61	1 ton	61 ton
Range	2,581	0.195 AUMs	503 AUMs
Other ²	204	55 bushels	7,810 bushels
Fallow	2,554	0	0
Total	8,212		

¹Data collected from Dawson County Agriculture Stabilization and Conservation Committee, Glendive, Montana, 1981.

²142 acres, oats; 26 acres, roads etc.,; and 36 acres, homesteads and windbreaks.

TABLE 3

CENTRAL BLOOMFIELD

FARM/RANCH OPERATIONS 1/

OPERATOR	INSIDE COAL TRACT (acres)							OUTSIDE COAL TRACTS (ACRES)							PERCENTAGE OF THE OPERATION WITHIN THE TRACT
	SMALL GRAIN CROP	HAY	GRAZING	SUMMER FALLOW	OTHER	TOTAL	PERCENTAGE OF TOTAL ACRES LEASED	SMALL GRAIN	HAY	GRAZING	SUMMER FALLOW	OTHER	TOTAL	GRAND TOTAL	
1	361	0	152	361	86*	960	50	0	0	0	0	0	0	960	100.0
2	193	0	80	192	15*	480	100	1,852	271	1,236	1,741	8	5,108	5,588	8.59
3	27	0	101	27	0	155	0	630	0	182	628	0	1,440	1,595	9.72
4	132	0	72	116	0	320	0	766	3	438	669	0	1,876	2,196	14.57
5	219	2	48	211	0	480	100	429	77	519	395	45	1,465	1,945	24.68
6	115	0	92	113	0	320	100	0	0	0	0	0	0	320	100.0
7	103	0	755	103	17	978	33.64	680	185	1,150	527	90	2,632	3,610	27.09
8	0	0	206	0	0	206	0	598	230	1,262	566	79	2,735	2,941	7.00
9	730	57	217	647	9*	1,657	0	485	38	78	428	0	1,029	2,686	20.24
10	17	0	80	17	6	120	0	947	100	812	937	91	2,887	3,007	3.99
11	350	0	528	335	27*	1,240	74.19	1,565	7	616	1,427	0	3,615	4,855	25.54
12	93	0	5	62	0	160	0	314	0	103	266	0	683	843	18.98
13	75	0	9	75	1	160	0	489	10	448	487	2	1,436	1,596	10.02
14	274	0	173	183	10*	640	0	0	0	0	0	0	0	640	100.0
15	73	0	21	61	0	155	0	1,070	2	1,011	886	0	2,969	3,124	4.96
16	51	2	45	51	7	156	0	430	95	317	368	41	1,251	1,407	11.09
17 Roads, Reservoirs etc.	0	0	0	0	26	26	0							32	
18															
19															
20															
21															
22															
23															
TOTAL	2,813	61	2,581	2,554	2/ 204	8,213		10,255	1,018	8,172	9,325	356	29,126	37,345	

1/Data collected from Dawson County Agriculture Stabilization and Conservation Committee, Glencive, MT. 1981

2/142 Acres, Oats; 26 Acres, Roads etc.; and 36 acres Homesteads

*/Homesteads within tract.

Agricultural Economics

This section will be forthcoming under separate cover.

Residential Homes

Approximately seven residential homes and several outbuildings are located within the tract (see Figure 2). These homes are served by existing underground telephone cables and overhead electrical transmission lines.

Transportation and Access

Good transportation access is available within and near the tract. State Highway 200 serves nearby Richey and a spur of the Burlington Northern railroad ends at Richey, Montana. State Highway 254 is adjacent to the east boundary from State Highway 200 south through Bloomfield and ending at State Highway 16 near Glendive, Montana. Several seasonal roads and all-weather county roads traverse through the unit.

Existing Rights-of-Way (Corridors)

A 10-inch high-pressure gas pipeline belonging to Montana Dakota Utilities crosses the center of the tract in a northwest-southeast direction (see Map 3). A 230 KV transmission line is located approximately 17 miles to the southwest and another 22 miles to the southeast. In addition, a 115 KV transmission line exists approximately 23 miles to the southeast.

The proposed route of the Northern Tier pipeline is located approximately 22 miles to the north.

Recreation

The tract is relatively isolated and devoid of recreational developments. There is legal access through the area, but private landowners control all the surface property. The recreation potential of this tract is known only in terms of hunting potential. No wilderness values are present.

Hunting District 732, which includes this tract, is important to the deer harvest in Region 7. In 1979 it had the second highest white-tailed deer harvest of any district in the region (Montana FW&P, 1980). A total of 547 white-tailed deer were harvested from Hunting District 732 in 1979. That was over 14% of the whitetail harvest from the 29 districts in the region.

There are no public access fishing ponds managed by state or federal agencies on the tract.

WILDLIFE AND FISHERIES

A basic wildlife inventory encompassing this tract is in

progress. Until this study is completed (field work, Oct. 81; final report, Dec. 81), all the significant wildlife values of the tract cannot be assessed. The occurrence of and use by threatened and endangered species, furbearers, song birds and upland game cannot be determined until the wildlife inventory is complete.

The 1,160 acres in the tract, within Hunting District 732, is prime white-tailed deer winter habitat. A whitetail density of 22.3 deer per square mile was determined in the winter survey of 1976-77 (Montana FW&P, 1980). The important habitat is located south of the tract boundary.

Essential mule deer winter habitat occurs on the extreme western portion of the tract (see Map 3). This habitat is a deep cut canyon and contains the only patches of hardwoods on the tract. The importance of the area to mule deer is due to both the vegetation and the topography. There are approximately 2,486 acres of the canyon within the tract boundary which also forms a corridor leading to 122 sq. miles of continuous habitat. Deer densities of 4.8 per square mile during the winter have been observed.

There is about one-half mile of highly valuable riparian habitat on the north fork of Thirteen Mile Creek on private surface and minerals essential to all wildlife in the area. The remainder of tract contains only marginal wildlife habitat.

There are no fish species of special concern on the tract (Elser, et al., 1981). There are no fisheries on the tract, however, the area does drain into Thirteen Mile Creek which does support marginal spring fisheries during wet years.

CULTURAL RESOURCES

The Central Bloomfield tract has not been systematically inventoried to date. Information from existing inventories (Davis, 1976; BLM unpublished data; Greiser, 1980) outside the tract, but within the Fort Union Region suggests that the predominant prehistoric sites should be lithic scatters of varying size, density and function (ca. 70-80%). Other expected prehistoric sites include stone circles (ca. 10%), ceramic-bearing sites, rock shelters and bison kills (ca. 10% combined). Expected historic resources include homestead and ranching remains (ca. 50%), historic graffiti and rock art (ca. 20%), freight roads, dugouts, stone cairns, trading posts, burials and battle sites (ca. 30% combined). Further information on cultural resource distribution and significance cannot be quantified prior to inventory.

BLM-sponsored contract inventory in the Fort Union Coal region is scheduled for the summer of 1981 to generate information sufficient to identify and predict the nature, occurrence and significance of cultural resources in the tract in the regional EIS. Subsequent to



Figure 2. This is one of the residences and unimproved roads within the tract.

inventory and prior to the regional EIS, BLM will apply unsuitability criterion 7 (43 CFR 3461.1 [g]) to all identified properties and will consult with the Montana State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP) regarding the effect of coal leasing on National Register-eligible properties, in accordance with the ACHP Programmatic Memorandum of Agreement with BLM, OSM and USGS, Section 106 of the National Historic Preservation Act (P.L. 89-665, as amended), and 36 CFR 800.

VISUAL RESOURCE MANAGEMENT

The scenic quality of this area is "low". The rolling terrain lacks significant relief characteristics, but is conducive to dryland farming. The riparian habitat along Thirteen Mile Creek drainage is significant in considering visual quality. No adverse intrusions exist in the tract area.

ECONOMICS AND SOCIAL CONDITIONS

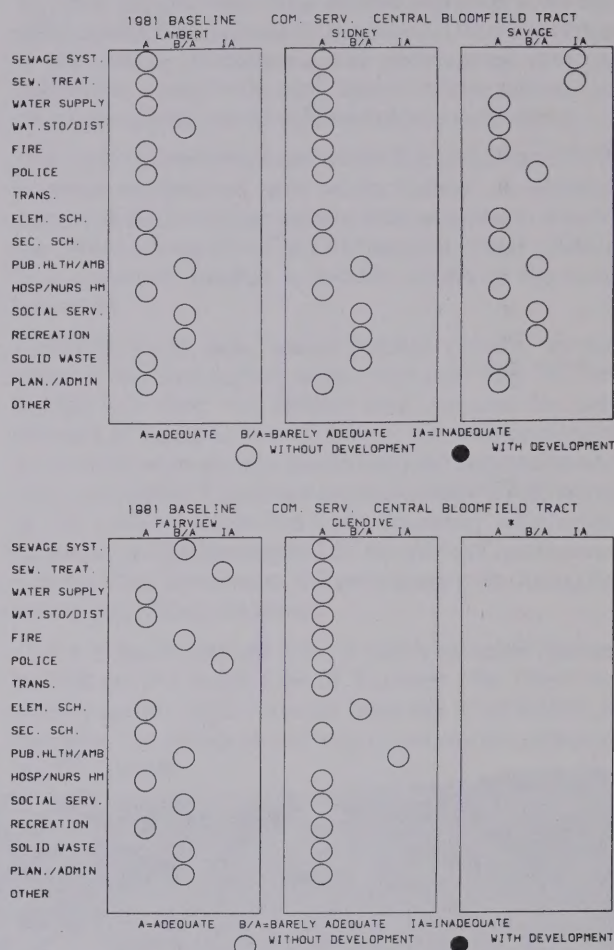
Existing and forecasted population and employment levels for the communities of Lambert, Sidney, Savage, Fairview, and Glendive, Montana, are shown in Figure 5 (in Chapter III). As this figure shows, future population levels in these communities without energy development (refer to dashed line) are expected to either decline somewhat or remain relatively stable from 1981 through 2000.

These communities are small, agriculturally oriented towns which do not have the capability to accommodate any significant population growth without some strain on public services. As Figure 3 shows, all of the above communities are presently (1981) experiencing some problems in providing an adequate or barely adequate level of one or more types of public services. For example, Savage is currently experiencing inadequate sewage treatment and collection facilities for its present population.

Access to retail outlets, availability of medical care and recreational programs, and lack of entertainment facilities were identified by Dawson County respondents as the major service problems now facing residents of the area. In Richland County, traffic and road maintenance, medical care, retail opportunities, and entertainment were listed by residents as the most significant local service problems.

In both Dawson and Richland counties, a large majority of residents appear to support local mining. The differences between the counties are minimal in terms of residents' feelings toward local coal mining. While these levels of support appear to be quite high, this does not necessarily mean that residents are willing to

FIGURE 3



SOURCE: Respective city/county or regional planners.

unconditionally accept increased mining in the area. Much of this support is qualified by the potential scale and location of development. In both counties, the major reasons given for support of local development is the nation's need for energy production. In addition, several residents (of thirty-six interviewed in Dawson and thirty-two in Richland) mentioned the availability of the local coal resource and the change for local economic growth through increased employment opportunities as reasons for supporting local development.

In both Dawson and Richland counties, reclamation of mined land is the dominant concern of residents. There is uncertainty with regard to the long-term effects of mining on the productivity of land. Other concerns include local social disruptions that would be associated with population growth, possible degradation of air quality, availability of revenues, and the relationships between landowners and coal companies.

Community leaders generally support coal mining in both Richland and Dawson counties. However, much of this support is qualified by the necessity to successfully

reclaim the land. Local communities having adequate lead time before population growth occurs, and the availability and distribution of revenues are also concerns. There is clearly awareness on the part of these leaders that coal development would involve additional pressures on local governments to provide services and facilities for incoming populations.

The friendly, informal, small town atmosphere that exists in Dawson and Richland counties was most often given by residents as that aspect of life in the area that they most appreciated. On the negative side, the lack of retail opportunities, the climate, and, in Richland County, the influx of newcomers were listed as major negative factors.

CLIMATE AND AIR QUALITY

The semiarid climate of east central Montana, which is typical of the Northern Great Plains, results from the area's extreme inland location. Rapidly changing meteorological conditions are common because of the movement of Pacific and Arctic pressure systems through the region.

The climate station utilized for meteorological data for the proposed lease tract is at Miles City (Table 4).

The annual mean temperature in the area is 46°F. The highest monthly mean temperature is 75°F (in July), and the lowest monthly mean temperature is 15°F (in January). The growing season averages 158 days at Miles City.

Precipitation in the area is quite light. Most of it is in the form of rain, in late spring and early summer. Annual rainfall totals about 14.2 inches, and snowfall about 32 inches.

TABLE 4
Meteorological Data for Selected Sites*

	Miles City
Temperature, °F	
Mean Annual	46
Mean Monthly Minimum (Jan.)	15
Mean Monthly Maximum (July)	75
Growing season for Grass (temperature 32°F), days	158
Precipitation, in.	
Annual Average Rainfall	14.2
Monthly Range Rainfall	0.5-3.1
Annual Snowfall	32.2
Average No. of mo/yr with Snowfall	10

Annual Stability (by class), % occurrence

Class A, B, C	15.8
Class D	54.3
Class E, F, G	29.9

Wind Direction

SE-S, 27%
W-NNW, 35%

Windspeed, mph (% of time)

0-3.5 (8.4)
3.6-6.9 (23.3)
7.0-11.5 (39.6)
11.6-18.4 (21.3)
18.5-24.2 (5.5)
> 24.3 (1.8)

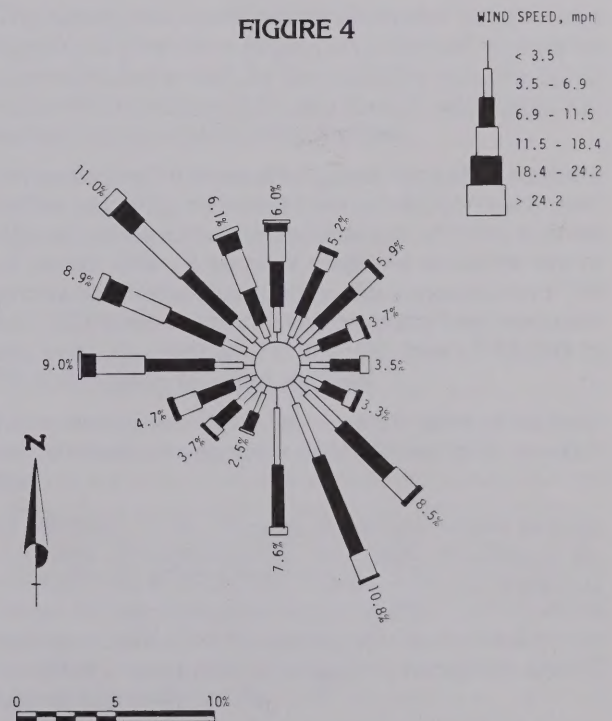
Average Windspeed, mph

10.6

*Sources: National Oceanic and Atmospheric Administration, 1980
Powder River Site Specific Analysis, 1981

Wind data used in this analysis were obtained at Miles City, the only station in the area that had data suitable for input into the dispersion model used. The wind rose in Figure 4 represents a summary of these data. Winds are predominantly from the W to NNW 35 percent of the time and from the SE to S, 27 percent. Windspeed averages 10.6 mph annually and exceeds 11.5 mph 28.6 percent of the time.

FIGURE 4



Miles City Wind Rose

SITE SPECIFIC ANALYSIS

Although the terrain offers little obstruction to the dispersion of pollutants, the area experiences prolonged periods of depressed mixing heights and low wind speeds, which tend to concentrate pollutants.

According to total suspended particulates (TSP) monitoring data, annual geometric means in this area is 25.9 $\mu\text{g}/\text{m}^3$ and the arithmetic mean is 42.5 $\mu\text{g}/\text{m}^3$. The

sparse population in the area precludes consideration of the sampler as an urban impacted site. The background level for this analysis was determined to be 42.5 $\mu\text{g}/\text{m}^3$.

No Class I areas fall within the impact range of the proposed tract. Visibility in the area ranges from 45 to 70 miles.

CHAPTER III

ENVIRONMENTAL CONSEQUENCES

TOPOGRAPHY

Mining and reclamation would result in a less contrasting topography. Original drainage patterns would be reestablished, returning the site to its general pre-mining appearance.

GEOLOGY

Production through the life of mine is estimated at 260.3 million tons of lignite. During this time, the tract would be temporarily committed to a single use that would in turn impact other uses.

The lignite removed by mining (260.3 million tons) and that portion left by current recoverable techniques (an additional 28.9 million tons) would be lost from future use.

SOILS AND RECLAMATION POTENTIAL

The proposed action would have a significant short-term impact on the soil in the tract (see Table 1). By the end of mine life, 8,213 acres would be disturbed.

Soil impacts include: displacement of soil from wind and water erosion, change in soil structure and natural fertility, and soil compaction from haul roads. Significant problems in revegetation and stabilization on steep slopes will occur.

In the tract, 82% of the soil has a low potential for wind erosion and 43% of the soil has a moderate potential for water erosion (see Table 1). Proper seeding of stockpiled soil would reduce this erosion rate.

Disturbances of the soil would result in alterations of soil structure and porosity. This alteration would affect permeability, infiltration rates, soil-air and soil-water relationships and bulk density. The natural fertility would be affected by disruption of the nutrient cycle and a decrease in organic matter content within the soil. Salinity content would increase as a result of the lower calcareous horizons being brought to the surface.

The soil profile reconstruction potential is determined by the soil hazard condition. The tract is rated 72 percent fair, 26 percent poor and 2 percent unsuitable for reconstruction. Suitability of the soil material for plant growth is rated as 11 percent good, 73 percent fair, 13 percent poor and 3 percent unsuitable (see Table 1). The soils rated poor can be reclaimed, but would require more intensive and costly management to be revegetated and stabilized. On the long-term the impacts to the soil would not be significant.

HYDROLOGY

Seepage into the mine pits would provide some of the industrial water supply for the mine. Four known existing wells would be destroyed and two known nearby wells could be impacted by lowered water levels during mining and/or by a degraded chemical quality following mining. The potable water supply for the mine can easily be provided by wells tapping the Fox Hills-lower Hell Creek aquifer. The additional public water supply needed because of the increase in population can easily be supplied by wells tapping the Fox Hills-lower Hell Creek aquifer with no significant impact to existing wells.

Some degradation of water quality would occur following reclamation in the replaced spoils and in the adjacent Tongue River aquifer southeast of the mining unit. The severity and extent of the impact depends on the rate of groundwater flow and the amount of increase in dissolved solids in groundwater that passes through the replaced spoils. The water would probably be suitable for livestock and wildlife use, but would not be potable. This represents a long-term adverse impact.

LAND USES

Vegetation and Agricultural Production

The leasing and development alternative would have a significant short-term impact on individual agriculture operations in the tract. By the end of the mine life, 8,213 acres of the tract would be disturbed, in addition to 160 surface acres used for mine facilities.

An average of 74 acres of cropland, excluding summer fallow, would be removed from production each year. This would be an average annual loss of 2,102 bushels of wheat. This 74 acres of cropland would be out of production ten to fifteen years with a maximum of 739 to 1,123 acres out of production in any one peak mining year, resulting in a maximum loss of 20,998 to 31,893 bushels of wheat annually.

Peak mining year disturbance of 61 acres of hayland would result in an annual loss of 61 tons of hay production.

An average of 64 acres of rangeland would also be removed from production each year, resulting in an average loss of 12 AUMs. This 64 acres of rangeland would be out of production ten to fifteen years with a maximum of 645 to 981 acres out of production in any one peak mining year, resulting in a maximum annual loss of 126 to 191 AUMs.

Further analysis of Table 3 reveals that agricultural production of the tract averages from 21% to 23% of the

combined total production of all 16 grain and livestock operations. The lone exception is hay production—only 5% is produced on the tract.

There are three small grain and livestock operations that are totally inside the tract. One operator leases all of his operation, another leases half of his operation, and the third operation is owner-operated. A fourth small owner-operator has less than 19% of his operation within the tract. The impact of mining on these operations for ten years is such that they would probably cease operation.

There are six leased operations inside the tract, three by large operators, one by a medium-sized operator and the two small operators previously mentioned. Since the medium-sized operator (line 5 of Table 3) has one-third of his cropland inside, he may also have to cease operation or find off-farm employment during the mining operation. The large operators should be able to continue in business in spite of the loss of use of their farm leases.

Regionally, these losses would not pose significant reductions in area agricultural production. Analysis of economic impacts, both to individual operations and regionally, will be forthcoming under separate cover.

Chief items of concern on the tract are the upland hardwoods (46 acres) and riparian shrub (19 acres) areas. These areas are vital to many wildlife species, especially mule deer, and there is doubt that they can be restored after mining and subsequent reclamation.

The Montana Department of State Lands will set the standards for establishing a diverse, effective, permanent vegetation cover on all rangeland areas, with coordination and cooperation from the Office of Surface Mining and the Bureau of Land Management.

Agricultural Economics

This section will be forthcoming under separate cover.

Transportation and Access

Access is available to the tract via a county road, however it would have to be upgraded to accommodate heavy traffic. Approximately 18 miles of private and county roads within the tract would eventually have to be relocated as mining progresses. In addition, approximately 11 miles of out-of-pit haul roads would be required. The haul roads are anticipated outside the tract and would have to be acquired from private land owners.

The major impact on the present transportation system due to mining at Central Bloomfield tract would be an increase in volume on existing transportation modes. This would result in increased accident rates, system deterioration, rising maintenance costs and decreased efficiency if not mitigated.

Existing Rights-of-way and Needs

Approximately 4.8 miles of an existing 10-inch high-pressure gas pipeline right-of-way passes through the center of the tract and would have to be relocated or a 100-foot buffer zone maintained. Right-of-way for electrical transmission lines would be needed for the mine. An existing 230 KV transmission line is located 17 miles southeast of the tract. Those facilities may be adequate for additional transmission lines. Approximately 160 acres outside the tract would be required for the mine facilities.

Recreation

The recreation potential of this tract might actually improve with lease activity as any developed water may be convertible to wildlife uses. However, the significant impacts during mining would be felt off-site. The influx of mine workers would cause additional pressure on existing recreation facilities or uses such as hunting and fishing within the region. The exact concentration or location of this activity is not predictable at this time.

WILDLIFE AND FISHERIES

Mining the agricultural lands would reduce the available winter forage, in a localized area, causing a redistribution of wintering white-tailed deer to other farmlands south of the tract. Upwards of 50 white-tailed deer were found feeding on haystacks during the winter inventory of 1976-77 (Martin, 1981). Damage to crops and haystacks could result if the white-tail concentrate south of the tract. This could be significant to individual operators.

Mining would remove approximately 2,486 acres of important mule deer winter habitat if the area is not declared unsuitable for mining (see Map 3). This area forms a narrow band leading to 122 square miles of essential winter range. Mining in these areas would cut off about two square miles in the northern part of this range forcing deer onto flat, less secure habitat, making them more vulnerable to hunting and poaching pressures.

Destruction of the habitat would cause a reduction in the numbers of animals in the herd which can not be quantified. However, it would be enough to reduce hunting opportunities in the area. This would be a long-term irreversible impact. If the area is declared unsuitable for surface mining there would be short-term impacts to mule deer. The disturbance from mining would probably make portions of the winter range unavailable. After mining and reclamation, the habitat would still be available and the mule deer could return.

Poaching and road kills have increased dramatically in areas of Montana, Wyoming and Colorado where

energy development has occurred. The problem is compounded in areas where shift changes coincide with feeding periods, especially big game (Streeter, et al., 1979). The same would probably occur in this area.

Actions to mitigate these impacts available to entities other than BLM would be to provide mass transportation of workers and adjusting the times of shift changes which would greatly reduce poaching. This has been used successfully in other mining areas (Streeter, et al., 1979).

Providing funds for the Montana Department of Fish, Wildlife and Parks for increased law enforcement or adaption of a poaching clause in Union contracts would also help. Proposed haul road locations running through both the white-tail and mule deer winter concentration areas would result in major road kills of deer as well as the further destruction of essential mule deer winter habitat. About one-half mile of prime riparian habitat would be destroyed by mining. This would impact all of the wildlife in the area. Antelope and antelope hunting are of little significance on the tract.

CULTURAL RESOURCES

All cultural resources within the tract would be subject to direct impact from construction of mine and electrical plant and power line facilities, haul roads, water development, and mining activity. Cultural resources not immediately impacted by the above activities are subject to increased erosion, access and vandalism. Direct impact would result in damage and destruction to cultural resources, artifacts, their immediate environmental context and the information these contain. Subsurface cultural resources not previously located by surface inventory would also be destroyed.

Development of alternatives for avoidance and preservation of identified cultural resource properties is preferred, as these would minimize impacts to cultural resources. Should the tract be leased and these alternatives not be feasible, a scientific program of data recovery will be developed and implemented for all National Register properties and/or eligible properties within the tract.

VISUAL RESOURCE MANAGEMENT

The greatest impact on esthetic qualities, for the duration of mining, would be the marked change from a rural to an industrial setting. The mining operations would be visible from the state road (FAS 254). The mine facilities and railroad would be clearly visible. Dust arising from mine operations would probably be one of the most obvious visual impacts.

Following the period of mining, the mine site and the

visual signs of mining, would be largely, if not entirely, camouflaged by reclaimed vegetation.

Visual impact following successful reclamation would be insignificant.

Net Energy Analysis

A net energy analysis was calculated using the guidance contained in BLM Washington Office Information Memo 80-640, July 17, 1980. Approximately 37.7 British thermal units (Btus) would be expended to produce a pound of coal. That pound of coal would, in turn, produce about 6,698 Btus. The ratio of energy expended to that energy produced is 1 Btu/178 Btus.

ECONOMICS AND SOCIAL CONDITIONS

Construction and operation of the Central Bloomfield tract would result in significant impacts upon services in some communities within the areas as a result of population growth associated with employment opportunities. Figure 5 shows forecasted community employment and population levels through the year 2000 both with and without development of the Central Bloomfield tract. As these figures show, Lambert, Sidney, Savage, Fairview, and Glendive, Montana would experience a significant increase in both population and employment as the result of the development of the tract.

Changes in regional personal income from tract development are expected to be insignificant through the year 2000. The communities in which the workers and their families reside would experience some increases in economic activity as a result of employment payroll expenditure and through company expenditures for goods and services during the construction and operation phases. The Central Bloomfield tract is forecasted to boost regional personal income by a maximum of 1.3% over baseline values by 1987 and beyond as a result of expenditures associated with the operation of this tract.

Peak employment during the construction phase of the Central Bloomfield tract is expected to occur in 1986 at 205 employees with full operations employment expected in 1989 at 290 employees. Using 1986 as the first primary impact date, it is estimated that the communities of Lambert, Sidney, Savage, Glendive and Fairview would experience an inadequate level of one or more community services as a direct result of the 1986 peak construction employment/population levels (Figure 6). Glendive, for example, is forecasted to face an inadequate water supply situation as a result of population growth attributable to the construction of the Central Bloomfield tract. Additionally, Richey, Lindsay, Bloomfield and West Glendive would experience

FIGURE 5

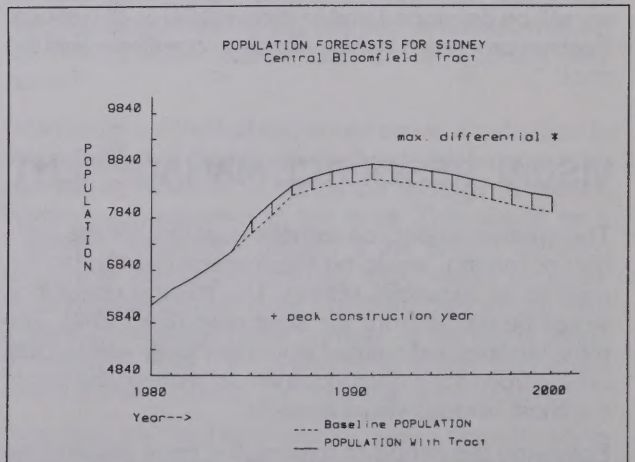
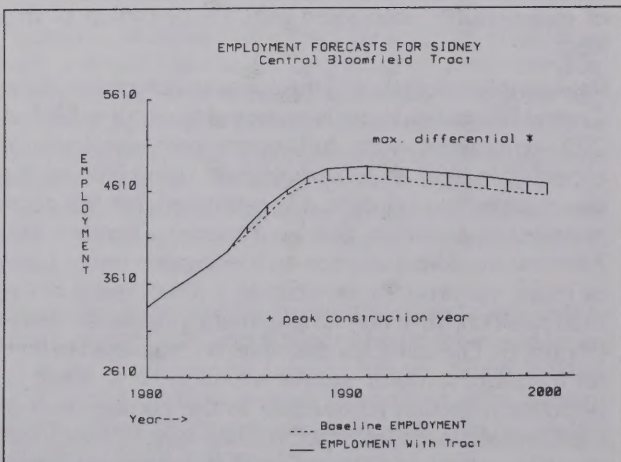
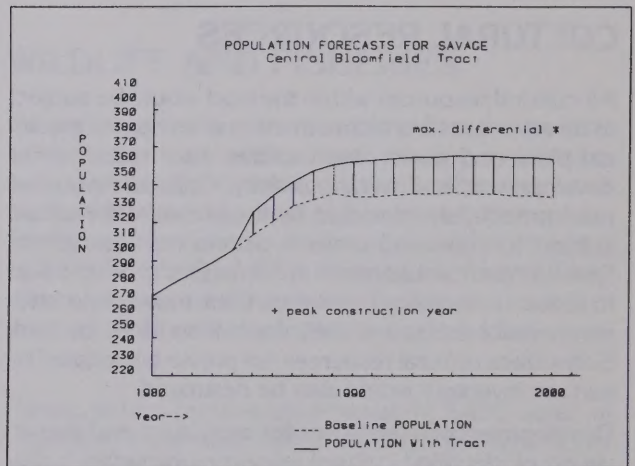
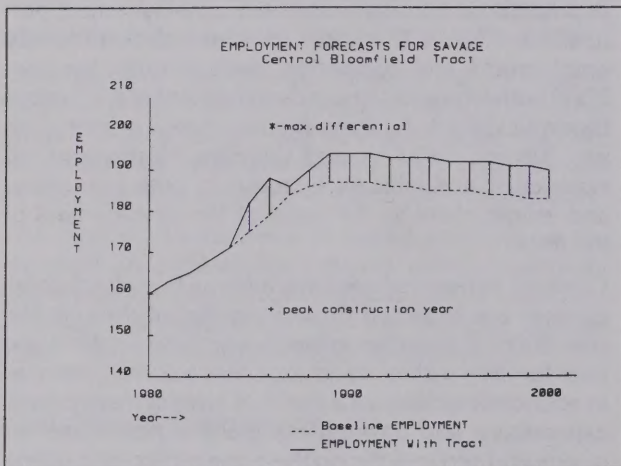
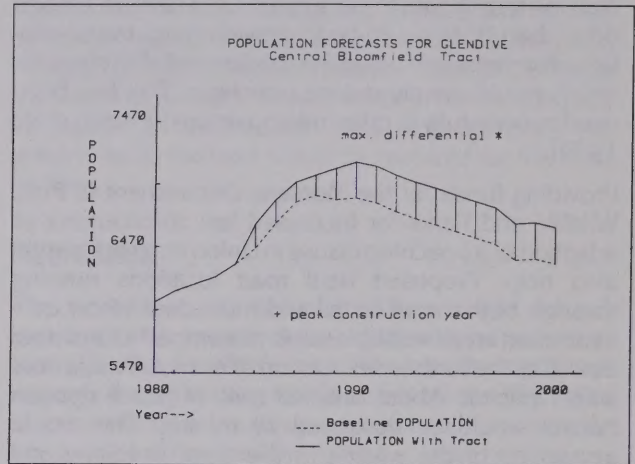
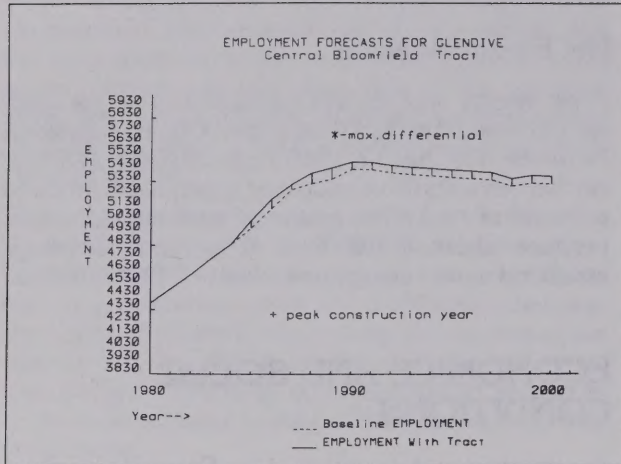
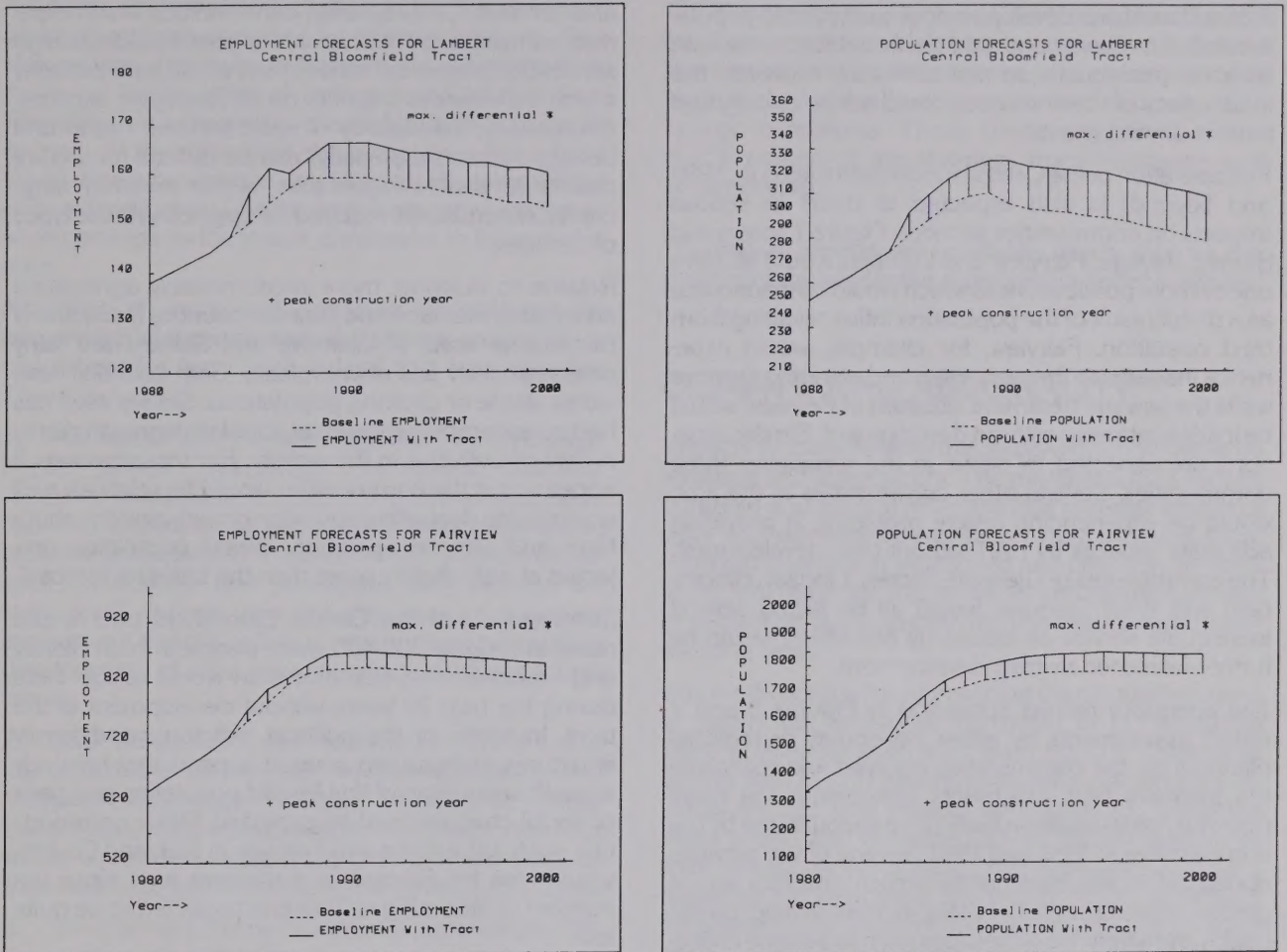
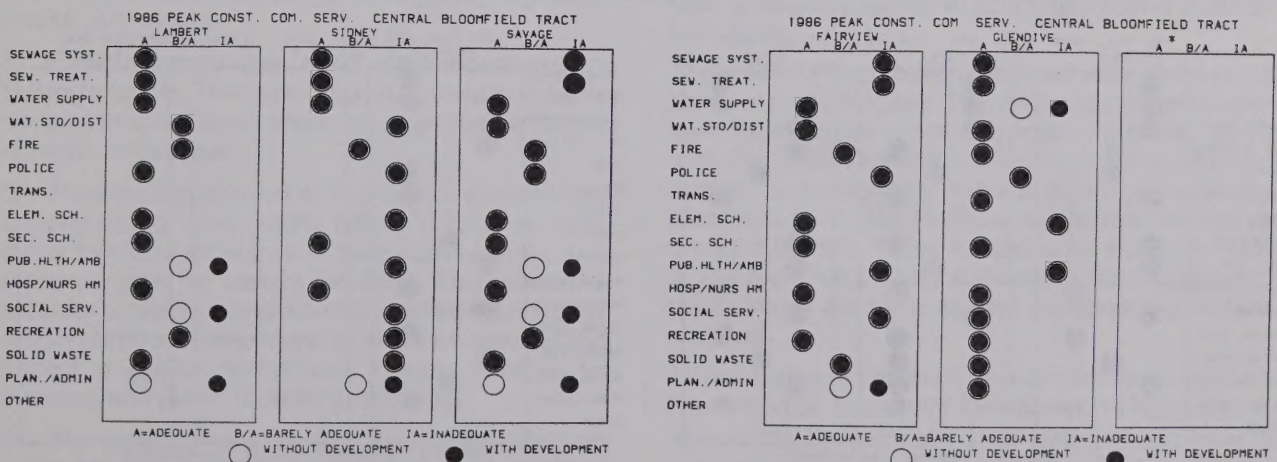


FIGURE 5 (continued)



SOURCE: Mountain West Research, Inc., 1981.

FIGURE 6



SOURCE: Respective city/county or regional planners.

an inadequate level of some community services by 1986 without tract development. A tract-related population influx in these communities would further exacerbate an inadequate service situation, however, the inadequacy of these services could not be directly tied to tract development.

Full operation of the Central Bloomfield tract (i.e., 1991 and beyond) is also expected to result in serious impacts on communities services. Figure 7 shows that Sidney, Savage, Fairview and Lambert would all have one or more public services which would be inadequate as a direct result of the population influx resulting from tract operation. Fairview, for example, would experience inadequate fire protection and planning services while the sewage treatment situation in Fairview would be inadequate even without development. Similar situations are expected to occur in the remaining three communities. Several other communities in the area would be experiencing severe problems in providing adequate services by 1991 without tract development. The communities of Glendive, Richey, Lindsay, Bloomfield and West Glendive would all be facing several inadequate service situations by 1991 which would be further worsened by tract development.

The adequacy ratings appearing in Figures 6 and 7 reflect assessments by either city-county or regional planners for the communities involved and constitute the planners best judgments concerning the fiscal (revenue/cost) situation likely to be encountered by the communities in 1986 and 1991. Several of the services appearing in the community service graphics are of greater importance than others in maintaining public health and safety. Basic services such as sewage collection and treatment, water supply and water storage/distribution, health care and police/fire protection are of more immediate concern to community well-being

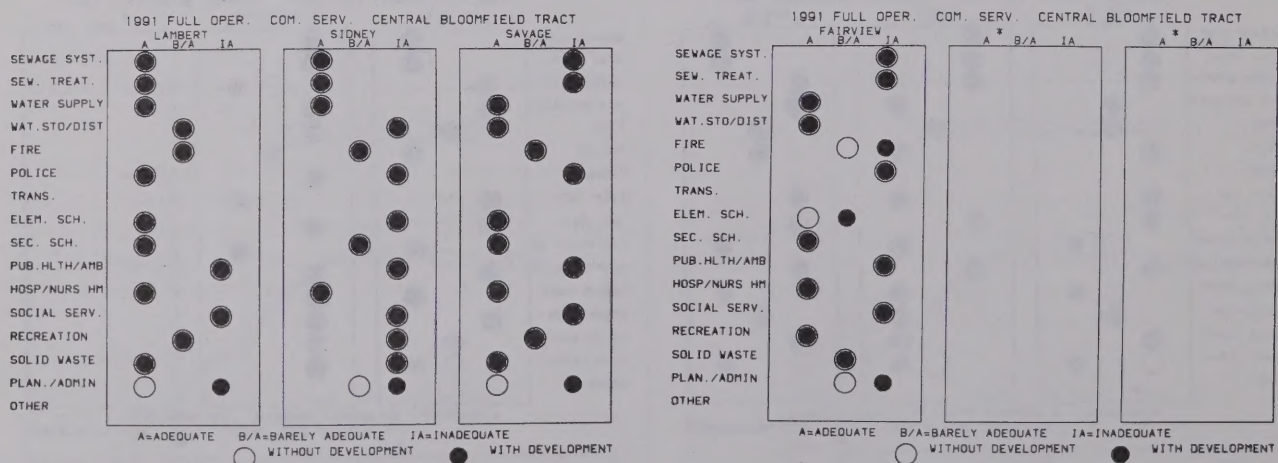
than are nonbasic services such as recreation facilities and libraries. Consequently, communities which experience impacts to these basic services would undergo somewhat greater difficulties than would a community which experiences impacts on its non-basic services. Additionally, inadequacy of basic services (water and sewage systems especially) can be difficult for a community to deal with because of the relatively large capital expenditures required for upgrading these types of services.

Relative to outlying, more predominately agricultural areas, both Richland and Dawson counties (particularly the county seats of Glendive and Sidney) are fairly diverse socially and economically. Both counties have either stable or growing populations. Sidney itself has had considerable exposure to population growth due to recent oil activities in the vicinity. For these reasons it appears that the communities would be relatively well equipped to deal with population growth over the short-term and with an operations phase population projected at only slightly more than the baseline forecast.

Development of the Central Bloomfield tract would result in roughly 300-400 more people in both Sidney and Glendive-West Glendive than would reside there during the next 20 years without development of the tract. In terms of the political, religious, and family structures of these two areas, it appears that relatively smooth absorption of this level of population and pace of social change could be expected. Other communities, such as Lambert and Fairview in Richland County, would also be affected at a minimal level since the number of incoming residents is projected to be quite low.

Since development of the Central Bloomfield tract would result in population levels somewhat higher than would exist without development, it is likely that local

FIGURE 7



SOURCE: Respective city/county or regional planners.

residents would notice a change in the social atmosphere so strongly endorsed by existing residents. This change would likely be noticeable but not particularly profound in the cities of Sidney and Glendive-West Glendive which are mainly affected by the tract's development. At the same time, the higher population base could attract businesses providing retail opportunities and entertainment. Some residents now list these shortcomings as the major drawbacks to living in the area.

Mitigation of social and economic impacts can be accomplished through several technical and/or financial categories from both federal and state sources. These include:

1. Mountain Plains Federal Regional Council Energy Impact Office. This office has several functions designed to alleviate impacts on counties and communities, including: a) provide information about and facilitate applications for technical and financial assistance, b) develop and participate in workshops for state, local, federal, and industry people on impact assessment and mitigation, c) encourage and facilitate development of local energy impact assessment task forces.
2. HUD, USGS, DOE, EPA and Department of Labor are all active in sponsoring advanced planning and mitigation assistance. However, because of federal budget cuts, it is unclear whether any federal agencies will be committed to providing technical assistance to state and local governments in energy impacted areas.
3. The Farmers Home Administration (FmHA) 601 Program provides grants to designated (approved) coal impact areas for planning, site acquisition, and development of public facilities and services in addition to housing on sites owned by a city or county. However, currently there are no Montana counties in the Fort Union Region which are designated as being eligible for FmHA 601 monies.
4. States currently receive 50% of the federal mineral leasing royalties. This money could be used to mitigate impacts in those areas which are impacted by federal mineral development.
5. Montana Department of Commerce (formerly the Department of Community Affairs (DCA)) provides direct technical assistance to communities in the coal resource areas of eastern Montana. This assistance includes workshops and training sessions in local planning and impact assessment, growth management and impact mitigation techniques, funding sources for planning and public facilities and others.
6. The eastern Montana field office of the Department of Social and Rehabilitative Services is available to assist eastern Montana communities assess and plan for human service impacts.

7. Funding by the Montana Coal Board is available to local governments which have been required to expand the provision of public services as a consequence of large scale development of coal mines and coal-using energy complexes. These funds originate from an 8.75% portion of the revenues from Montana's coal severance tax.

"Technical reports are available which discuss the methodology used in the economic or social analyses."

CLIMATE AND AIR QUALITY

Impacts on climate from the proposed action would be localized and insignificant. The modification of surface contours and surface reflection due to redistribution of soils and removal of vegetation may produce slight localized changes in windspeed and direction, temperature, and humidity. Reclamation with reestablishment of vegetation would largely mitigate these impacts over the long term.

The methodology for determining the air quality impact of particulate emissions consisted of (1) obtaining mine profiles for each tract from the U.S. Geological Survey (USGS), (2) obtaining emission factors for individual surface coal mining operations, (3) using the mine profile and emission factors for calculations of total emissions, (4) entering the emission data into a modified climatological dispersion model (CDMQC) for prediction of ambient concentrations, and (5) comparing predicted concentrations to National and State air quality standards and to Prevention of Significant Deterioration (PSD) increments. The air quality impact was analyzed for the peak production year.

Details about the CDMQC model, emission factors, and their application appear in a technical report available from BLM.

The results of the modeling exercise were plotted on a series of isopleth maps. The predicted concentrations were then compared with applicable air quality standards. The 1970 Clean Air Act Amendments established primary and secondary National Ambient Air Quality Standards (NAAQS). Montana also has established air quality standards. These standards are shown in Table 5. The Montana primary standard for total suspended particulate is the same as the corresponding Federal standard.

All pollutant sources must be evaluated to determine if Prevention of Significant Deterioration (PSD) regulations apply. These standards are also shown in Table 5.

During the peak production mining period, total particulate emissions from the proposed action are predicted to be 1712.2 tons per year, with best available control technology applied.

TABLE 5
Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Primary Standards		Montana State Standards	
		ug/m ³	ppm	ug/m ³	ppm
Sulfur Dioxide	Annual (Arithmetic)	80	0.03	60	0.02
	24-hour	365	0.14	260	0.10
	3-hour			650	0.25
Total Suspended Particulate	Annual (Geometric)	75		75	
	24-hour	260		200	
Carbon Monoxide	8-hour	10,000	9		
	1-hour	40,000	35		
Photochemical Oxidant	1-hour	240	0.12		
Nitrogen Dioxide	Annual	100	0.05		
Lead	3-month	1.5			

Prevention of Significant Deterioration (PSD) Regulations

Class II area	ug/m ³
Sulfur Dioxide	
Annual Arithmetic mean	30
24-hour maximum	91
3-hour maximum	512
Particulate matter	
Annual Geometric mean	19
24-hour maximum	37

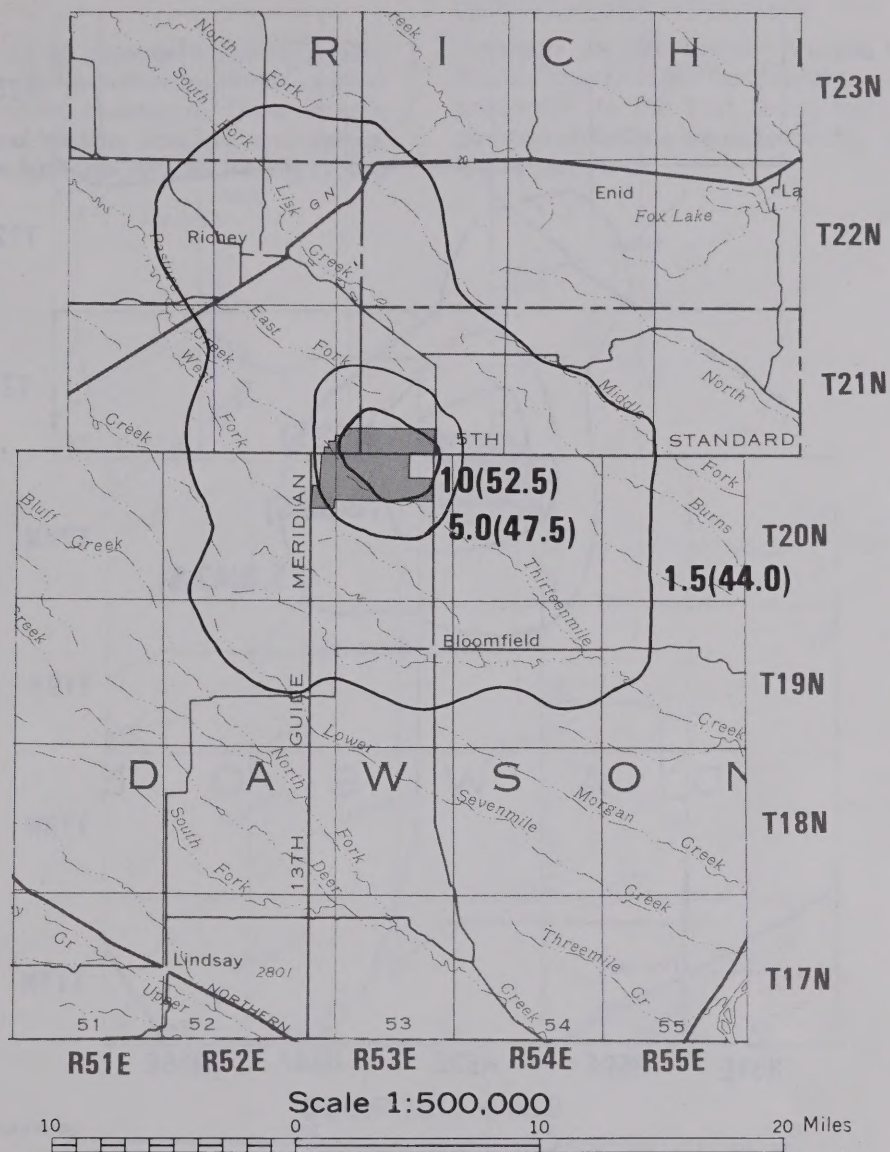
Source: National Ambient Air Quality Standards 1970; Montana State Department of Health and Environmental Sciences.

Dispersion modeling was performed to predict particulate concentrations for comparison with the National Ambient Air Quality Standards and State of Montana standards. Areas within the active mining area, such as the mine facilities, pit areas, and reclamation areas, are not subject to these standards.

The isopleth lines on Figure 8 indicates annual geometric mean average particulate concentrations that will result from implementation of the proposed action. During peak coal production, the highest annual geometric mean concentration at a location off the mine site would be 11.9 ug/m³. With a background concentration of 42.5 ug/m³, the highest annual geometric mean ambient concentration would be 54.4 ug/m³. This value is less than the Montana particulate standard of 75 ug/m³.

Montana's 24-hour standard of 200 ug/m³ cannot be exceeded more than once a year off the mine site. Figure 9 shows predicted 24-hour maximum particulate concentrations that would result from the proposed action. The isopleths represent a composite of 24-hour levels; therefore, the values occur over the year period indicated rather than simultaneously. 24-hour maximum values with the proposed action during full coal production would be as high as 34.0 ug/m³. With the background concentration added, ambient levels would be 76.5 ug/m³. These levels are within the Montana 24-hour standards.

In addition to the annual and maximum particulate standard, Montana has a PSD incremental standard of 19 ug/m³ annually and 37 ug/m³ for a 24-hour maximum which cannot be exceeded more than one time

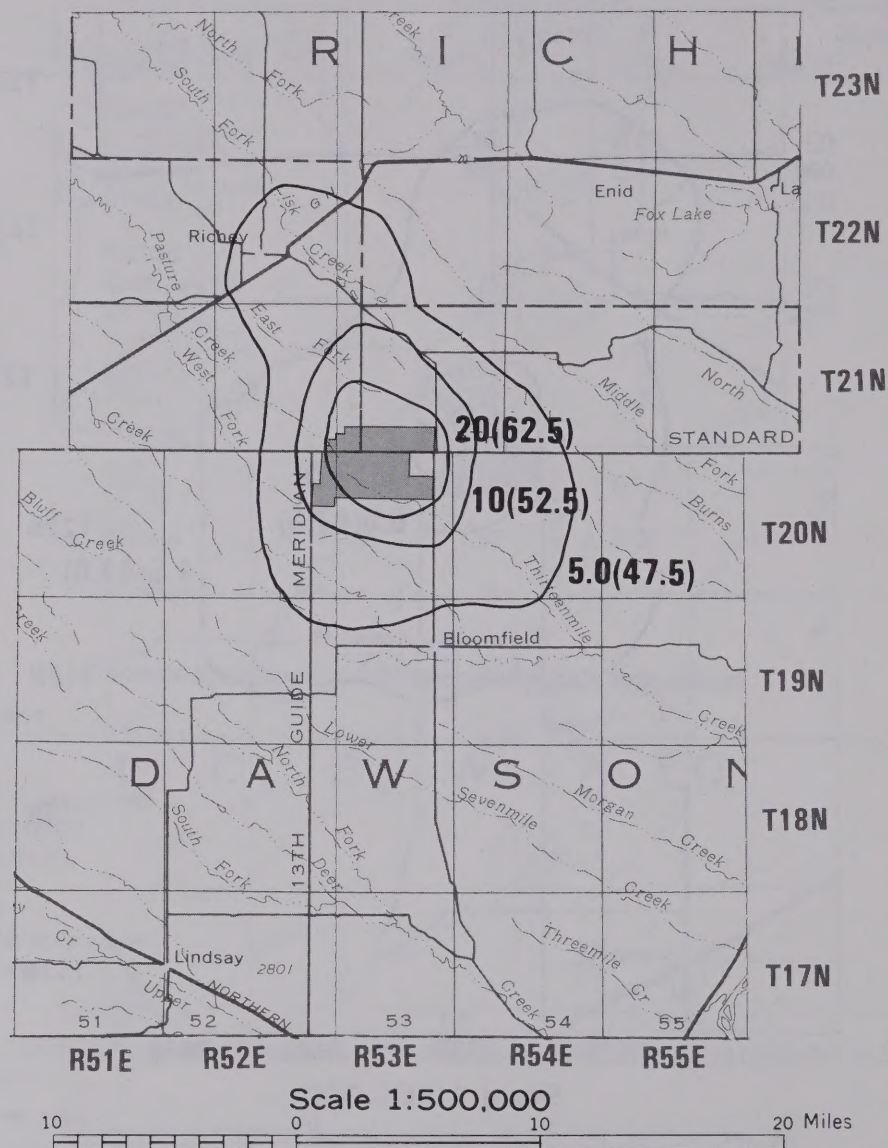


Central Bloomfield Tract

TSP Annual Average Concentration (ug/m³) Isopleths

Note: Number in parenthesis indicates predicted concentration plus background concentration.

FIGURE 8



Central Bloomfield Tract

TSP Maximum 24-hour Concentration ($\mu\text{g}/\text{m}^3$) Isopleths

Note: Number in parenthesis indicates predicted concentration plus background concentration.

FIGURE 9

REFERENCES

per year. The proposed mining activity will not violate these standards.

Several small sources of gaseous pollutants (sulfur dioxide, ozone, and nitrogen dioxide) are associated with surface coal mining operations. These include haul trucks, front-end loaders, scrapers, and dozers. Sources also include light-duty vehicles (chiefly pickup

trucks) operated in the mine and employee vehicles operated on mine access roads.

Review of the Site Specific Analysis Reports for the Powder River tract that had similar tons per year of coal production to the Fort Union tract indicates that gaseous emissions are not expected to violate any air quality standards.

WILDLIFE

CULTURAL RESOURCES

REFERENCES

HYDROLOGY

- Dodge, K.A. and G. W. Levings, 1980. Measurements of Discharge, Gain or Loss in Flow, and Chemical Quality of the Poplar and Redwater Rivers, Northeastern Montana, October 24-25, 1970: U.S. Geological Survey Open-File Report 80-1210, 16p.
- Lee, R.W. 1980. Geochemistry of Water in the Fort Union Formation of the Northern Powder River Basin, Southeastern Montana: Helena, Montana, U.S. Geological Survey Water Resources Investigation 80-336, 17 p. 2 plates.
- McKinley, P.W. 1979. Water Quality of Selected Streams in the Coal Area of Eastcentral Montana: U.S. Geological Survey Water Resources Investigation 78-142, 49 p.
- Stoner, J.D. and B.D. Lesis, 1980. Hydrology of the Fort Union Coal Region, Eastern Montana: U.S. Geological Survey Map I-1236.
- Water Rights Bureau Field Office, Montana Dept of Natural Resources & Conservation, Glasgow, MT.

WILDLIFE

- Elser, Allen A., M. Gorges & L. Morris, 1980. "Distribution of Fishes in Southeastern Montana". Montana Department of Fish, Wildlife & Parks and U.S. Department of Interior, Bureau of Land Management, Miles City, Mt.
- Martin, Peter, 1981: personal communication. Montana Department of Fish, Wildlife & Parks, Forsyth, MT.
- Montana Department of Fish, Wildlife & Parks 1980. "Statewide Wildlife Survey and Inventory, Project No: W-130-R-11." Helena, Mt.
- Morris, Lani, T. Hightower, A. Elser, 1981. "An Aquatic Resources Assessment of Selected Streams in the Lower Yellowstone Basin". Montana Department of Fish, Wildlife & Parks prepared for Bureau of Land Management, Miles City, Mt.
- Streeter, Robert G., R. Moore, J. Skinner, S. Martin, T. Terrel, W. Klimstra, J. Tate, and M. Nolde, 1979. Energy Mining Impacts and Wildlife Management: Which Way to Turn. Transactions of the 44th North American Wildlife and Natural Resources Conference. Wildlife Management Institute, Washington, D.C.

CULTURAL RESOURCES

- Clark, Jerry and Michael Wilson, 1980. The Ayers-Frazier Bison Trap, (24PE30): A Late Plains Archaic Bison Kill on the Lower Yellowstone River. M.S. on file. Bureau of Land Management. Miles City.
- Class I Inventory, Historic and Prehistoric Resources 1980. Miles City District Office.
- Davis, Carl M., 1976. A Preliminary Archaeological Reconnaissance Survey, Bureau of Land Management Lands, Southeastern Montana. University of Montana. Missoula.
- Greiser, T. Weber, 1980. Class II Cultural Resource Inventory, Big Dry Resource Area, Prairie County, Montana. For the Bureau of Land Management, Contract Number YA-512-CT9-250. Historical Research Association. Missoula.
- Johnson, Ann M 1977. "Woodland and Besant in the Northern Plains: A Perspective". Archaeology in Montana, Vol. 18, No. 1, pp. 27-42. Bozeman.
- Reeves, Brian O.K., 1970. "Cultural Change on the Northern Plains, 1000 B.C. -A.D. 1000". Ph.D. Dissertation, University of Calgary, Alberta.
- U.S. Department of the Interior, Bureau of Land Management, 1980 Unit Resource Analysis, Circle and Richland Glendive Planning Units, Miles City District. Miles City District Office.
- Unit Resource Analysis, Haxby, McCone and Musselshell Planning Units, Miles City District. 1978. Miles City District Office.
- Unit Resource Analysis, Kinsey Planning Unit, Miles City District, 1980. Miles City District Office.
- Unit Resource Analysis, Prairie Planning Unit, Miles City District, 1980. Miles City District Office.

SUMMARY MATRIX

CENTRAL BLOOMFIELD TRACT

Resource and Environmental Considerations

ELEMENT	PRESENT SITUATION	ANTICIPATED EFFECTS OF LEASING	SIGNIFICANCE OF ANTICIPATED IMPACTS	DATA RELIABILITY	COMMENTS
Topography	Varies from breaks and badlands to rolling croplands.	Less contrasting topography, but original drainage patterns would be reestablished.	Very Low	Good	
Geology and Minerals	Tract is underlain by formations that are prospectively valuable for oil and gas. There are no known wells on the tract.	None	None	Acceptable	
	Tract contains 260.3 million tons of coal.	Loss of 28.9 million tons of coal for future use by current recoverable techniques.	Low	Good	
Soils and Reclamation Potential	There are 29 soil series in the tract mapped at level two in a survey done by Soil Conservation Service which are found along sedimentary plains and high terraces on uplands.	There will be displacement of soil by water and wind erosional forces; change in soil structure and natural fertility problems in revegetation and stabilization on steep slopes.	Significance of the impact will be high. Reconstruction potential is rated as 72 percent fair and suitability of soil material for reclaimability is rated as 73 percent fair and 3 percent unsuitable	Data reliability is 40 percent from the Dawson County Soil Survey for rangeland and 60 percent reliable for the bottomlands.	Existence of power lines, rail lines, and industry may encourage further development of area. The better soils in the bottomlands were more accurately mapped than those on the rangelands and steep-sided slopes.
Hydrology					
Surface Water Quantity	Thirteen Mile Creek and an unnamed tributary have only intermittent flow in response to thunderstorms and snowmelt. Estimated annual yield is 370 ac. ft.	Only very slight reduction of flow during mining. Possible slight effect after mining.	Low	Good	
Quality	Probably a sodium-sulfate type of water with dissolved solids concentration about 2500 mg/l. During high flow, the dissolved solids content would be 200-600 mg/l probably dominated by calcium and bicarbonate ions. Water could be used for stock and wildlife supply.	None	Low	Fair	Flow in Thirteen Mile Creek and tributary has not been sampled. Dissolved solids content is only an estimate.
Alluvial Valley Floors and Flood Plains	No alluvial valley floors are known to occur in the Central Bloomfield mining unit.			Good	

SITE SPECIFIC ANALYSIS

ELEMENT	PRESENT SITUATION	ANTICIPATED EFFECTS OF LEASING	SIGNIFICANCE OF ANTICIPATED IMPACTS	DATA RELIABILITY	COMMENTS
Ground Water Use in Tract	2 stock and 2 domestic wells in use in the tract and 1 nearby stock or domestic supply wells within 1 mile of tract boundaries.	All wells in the tract would be destroyed.	Minimal cost for mining company to redrill well. The domestic wells could be destroyed if mining is deep enough to disturb Tongue River aquifer.	Good	Well locations obtained from USGS & State of Montana inventories. Number of actual existing wells may be different than inventories.
Quantity	Natural groundwater flow in near-surface aquifers is to the southeast, toward the Yellowstone River. Flow in deeper aquifer is to the northeast.	Flow into mine pits probably would provide industrial water supply for mine. 2 wells outside tract could be affected during mining by lowered water levels. Additional public water supply of about 400 AF/HR needed due to increased population.	Possibly significant if water level in nearby domestic well is lowered.	Good	Existing wells in tract will probably have to be re-drilled into deeper aquifers to obtain comparable quantity.
Quality	Dissolved solids content of well water in and near tract ranges from 2000 to 3000 mg/l, dominated by calcium, magnesium, and sulfate ions.	Some degradation of Tongue River aquifer at and to southeast of tract could follow reclamation and replacement of spoils.	Severity of impact depends on rate of groundwater flow and increase in dissolved solids in groundwater that passes through replaced soils.	Fair-Good	
Vegetation Rangeland Types: Prairie County Grassland Northeastern (MT) Grassland.	Native vegetation covers 31% or 2,581 acres of the tract. Use of the tract is by crop-livestock operations. Vegetation provides food for wildlife, retards stream erosion, and has beneficial effect on air & water quality.	Kinds of vegetation and Acres Being Disturbed: Grassland 1,819 Sagebrush 203 Badlands 494 Upland Hardwoods 46 Riparian Shrub 19 Total 2,581	High, term elimination of established plant communities and reduction of species diversity. There will be a high impact locally on non-game wildlife species which may continue long after reclamation. Low-following successful reclamation	Data reliability is 95% from the Dawson Co. ASC Committee. Reliability of data determined by cross checking data received. There is no data at present that lists the kind or numbers of non-game species on the tract.	Many native plant lost through mining. Impact may be lessened by immediately re-spreading topsoil.
Livestock Forage in Animal-Unit-Months (AUMs) (Dawson County Average)	Average annual production is 503 AUM's.	Average annual loss of 12 AUMs. Each acre would be out of production from 10 to 15 years. Maximum loss for any one peak mining year would be 645 to 981 acres and 126 to 191 AUMs.	Moderate to high depending upon individual operation. Low to moderate for overall tract.	Grazing data from Dawson Co. Conservation District Long Range Program developed in '75	
Threatened or Endangered Plant Species	There are no reports of threatened or endangered plant species on the tract.	Low	Low	Good	No plants in MT. have been accepted as yet by the FWS for inclusion on the Threat. or Endangered Plant List.

ELEMENT	PRESENT SITUATION	ANTICIPATED EFFECTS OF LEASING	SIGNIFICANCE OF ANTICIPATED IMPACTS	DATA RELIABILITY	COMMENTS
Noxious Weed Species	There are 4 noxious weeds found growing in the Redwater MFP area. Canada Thistle is the only noxious weed found on the tract. Species are: A. Canada Thistle B. Leafy Spurge C. Cocklebur D. Field Bindweed	Low to Moderate	Low to Moderate	Data obtained from the Richland-Glendive Planning Unit documents, developed in 1978.	The variation of impact depends on whether the mining operation disturbs noxious weeds before or after seed has been produced & how the topsoil containing noxious plant is handled.
Agriculture	There are 5,570 acres of land in the tract that are currently being cropped. The irrigated lands are found in the bottom lands. The balance of the land is found adjacent to the bottomlands.	Average annual loss of 79 acres excluding 2,554 total acres of summer fallow. Annual production on this 70 acres would be 2,102 bu. of wheat. Maximum loss in any one peak mining year would be 739 to 1,123 acres and 20,988 to 31,893 bu. of wheat.	Moderate to high depending upon individual operation. Low to moderate for overall tract production.	Data reliability is 95% from the Dawson Co. Agriculture Stabilization and Conservation Committee. Reliability of data determined by cross-checking data received.	
Land Use	No industrial activity. Farming is primary use. Little or no ranching. Seven residential homes.	Introduction of industrial activities. Land required for mines, roads, and powerline rights-of-way. Land required for housing development.	Moderate during mining. Low to none after reclamation.	Good	Existence of power lines, rail lines, and industrial activities may encourage further development of area.
Wildlife Mule Deer	See Range Section for acreages, steep sided canyon with hardwoods and security cover.	If not declared unsuitable, 2,486 acres of essential habitat destroyed and migration corridor cut off. Short term impacts from disturbance if declared unsuitable.	Significant irreversible impacts to essential mule deer winter range. Reduction in hunting opportunities from habitat destruction and population reduction from poaching.	Good	Reclamation of steep sloped shrub habitat unsure.
Threatened & Endangered Species	None known to occur. Not accessible until baseline study complete (Dec. 1981)	Insignificant with present data.	Insignificant	Good, not complete	About 1/2 mile of riparian habitat on private surface and mineral will be destroyed. If drainage is re-created, reclamation is possible.
All other wildlife and fisheries.	Marginal habitat not an important wildlife area except canyon mentioned above.	Insignificant			
White-tailed Deer	Up to 22.5 white-tailed deer/sq.mi. feeding on haystacks in winter on tract.	Possible increased crop depredations from white-tailed deer on areas off of tract.	Could be significant to individual operators.	Good	

SITE SPECIFIC ANALYSIS

ELEMENT	PRESENT SITUATION	ANTICIPATED EFFECTS OF LEASING	SIGNIFICANCE OF ANTICIPATED IMPACTS	DATA RELIABILITY	COMMENTS
General					Increased poaching could significantly reduce all wildlife populations in the region if not controlled. It could reduce recreation opportunities.
Cultural/ Historic Values	Tract not inventoried to date. BLM sponsored inventory scheduled for 1981. Expected prehistoric resources include lithic scatters (70-80%), stone circles (10-20%), ceramic bearing sites, rockshelters, kill-sites (10% combined). Expected historic resources include homestead and ranch remains (50%), historic rock art (20%), freightroads, dugouts, cairns, trading posts, burials and battle sites (30% combined).	Direct impact to all cultural resources in the tract through mining and vandalism. (Inventory must be completed to determine specific number of sites impacted.	Damage and destruction to sites, artifacts, their immediate environmental context and the data these contain. Low if required mitigation is followed. Low if required mitigation is successful.	Good to excellent.	Expected resources in tract have been extrapolated from the literature on reported sites in the Fort Union KRCAs and inventory surrounding the Fort Union Region (BLM unpub., David, 1976; Greiser, 1980; Johnson, 1977; Reeves, 1970).
Recreation	No development or known uses on tract. Road access, but no public access to surface land.	Positive: (1) Access to surface property (2) possible ORV zone (3) aquatic potential (4) Reduction-hunting opportunities Negative: extra pressure on existing rec. facilities within region--due to added population.	Short term - moderate Long-term - low	Poor	Recreation data (research) does not exist for this area.
Wilderness	No wilderness in tract	None	None	N/A	N/A
VRM	Class "C" Scenery rating. Rolling terrain, which supports dryland farming. Pleasant habitat mix along Thirteen Mile Creek. No adverse intrusions within tract.	Loss of natural landscape characteristics; air pollution; powerline intrusions; facility development; lowering of scenery quality to minimal rating.	Short-term - high Long-term - low	Good	Loss of visual qualities is to be expected with extractive activities.
Net Energy Analysis	6,698 Btus/lb.	The ratio of energy expended to that energy produced is 1 Btu to 178 Btus.	None	Acceptable	
Air Quality	Excellent	Minimal background addition. All applicable standards will be met.	Insignificant	Fair	

Economics and Social Conditions

ELEMENT	PRESENT SITUATION	ANTICIPATED EFFECTS OF LEASING	SIGNIFICANCE OF ANTICIPATED IMPACTS	DATA RELIABILITY	COMMENTS
Population/ Employment	Population and employment levels are forecasted to be relatively stable through the year 2000.	Communities of Glendive, Lambert, Savage, Circle, and Fairview would experience population increases.	Population increases in those five communities are of low to moderate significance.	Good	See population and employment graphics in Chapter 3 for more detail.
Regional Personal Income	Regional personal income forecasted to increase moderately through the year 2000.	Slight increase in regional personal income from tract construction and operation.	Insignificant	Fair	
Infrastructure	Most services are currently adequate or barely adequate in Glendive, Lambert, Savage, Circle, and Fairview.	These five communities would have one or more services which would become inadequate as a direct result of tract development.	Glendive and Fairview would experience moderate to high impacts as a result of water supply and fire protection (respectively) becoming inadequate. Low to moderate significance in remaining communities	Excellent.	See community service graphics in Chapter 3 for greater detail.
Resident Perception of Community Services	Problem areas: Dawson County (a) medical care (b) recreation/entertain. Richland County (a) roads/traffic (b) medical care (c) recreation/entertain.	N/A	N/A	Good — both counties	
Social Attitudes	General support (conditionally) of coal development in Dawson and Richland counties	N/A	N/A	Good — both counties	
Quality of Life	Most residents favored the informal small town atmosphere.	Some slight deterioration of quality of life.	Insignificant	Good — both counties	

CENTRAL BLOOMFIELD TRACT UNSUITABILITY CRITERIA RESULTS

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
1. Federal land systems	Applied	N/A	N/A	No federal land systems found within the tract.
2. Rights-of-way and easements	Applied	None	None	Applied to Federal surface and/or private surface over federal coal.
3. Buffer Zones	Pending	N/A	Yes	Requires agreements w/local governments and private owners of dwellings.
4. Wilderness study areas	Applied	N/A	N/A	No wilderness study areas found within tract.
5. Scenic areas	Applied	N/A	N/A	No scenic areas found within tract.
6. Land used for scientific studies	Applied	N/A	N/A	No lands used for scientific study were found within the tract.
7. Cultural and Historical Sites	Pending further study	N/A	Yes	Applied upon completion of inventories (Dec., '81)
8. Natural areas	Applied	None	None	No designated natural areas within the tract.
9. Federally listed endangered species	Pending further study	N/A	Yes	To be applied in Dec. '81.
10. State listed endangered species	Pending further study	N/A	Yes	To be applied in Dec. '81.
11. Eagle nests	Pending further study	N/A	Yes	To be applied in Dec. '81.
12. Eagle roosts and concentration areas	Pending further study	N/A	Yes	To be applied in Dec. '81
13. Falcon cliff-nesting sites	Pending further study	N/A	Yes	To be applied in Dec. '81
14. Migratory birds	Pending further study	N/A	Yes	To be applied in Dec. '81

SITE SPECIFIC ANALYSIS

Criterion	Applicable to Tract	Exception Used (if applicable)	Additional Data Needed	Comments
15. State resident fish and wildlife	Pending further study	N/A	Yes	To be applied in Dec. '81
16. Flood plains	Applied	None	None	No significant flood plains were found within the tract.
17. Municipal watersheds	Applied	None	None	No municipal watersheds were found within the tract.
18. National resource waters	Applied	None	None	No national resource waters were found within the tract.
19. Alluvial valley floors	Applied	N/A	None	No drainages within the tract qualify as AUFs.
20. State proposed criteria	Applied	None	None	No State criteria

PRELIMINARY FACILITY EVALUATION REPORT

GOALS AND OBJECTIVES

The purpose of this report is to provide a preliminary evaluation of the facility's current state and to identify areas for improvement. The report will focus on the following objectives:

1. Assess the current state of the facility.

2. Identify areas for improvement.

3. Develop a plan of action.

4. Implement the plan of action.

5. Monitor and evaluate the results.

6. Report on the results.

7. Update the report as needed.

8. Maintain the facility in a state of readiness.

9. Ensure the facility is safe and secure.

10. Provide a high level of customer service.

11. Maintain accurate records.

12. Follow all applicable laws and regulations.

13. Keep the facility clean and well-maintained.

14. Provide a safe and secure environment for all customers.

15. Provide a high level of customer service.

16. Maintain accurate records.

17. Follow all applicable laws and regulations.

18. Keep the facility clean and well-maintained.

19. Provide a safe and secure environment for all customers.

20. Provide a high level of customer service.

21. Maintain accurate records.

22. Follow all applicable laws and regulations.

23. Keep the facility clean and well-maintained.

24. Provide a safe and secure environment for all customers.

25. Provide a high level of customer service.

PART I

Introduction and Purpose

The purpose of this report is to provide a preliminary evaluation of the facility's current state and to identify areas for improvement. The report will focus on the following objectives:

1. Assess the current state of the facility.

2. Identify areas for improvement.

3. Develop a plan of action.

4. Implement the plan of action.

5. Monitor and evaluate the results.

6. Report on the results.

7. Update the report as needed.

8. Maintain the facility in a state of readiness.

9. Ensure the facility is safe and secure.

10. Provide a high level of customer service.

11. Maintain accurate records.

12. Follow all applicable laws and regulations.

13. Keep the facility clean and well-maintained.

14. Provide a safe and secure environment for all customers.

15. Provide a high level of customer service.

16. Maintain accurate records.

17. Follow all applicable laws and regulations.

18. Keep the facility clean and well-maintained.

19. Provide a safe and secure environment for all customers.

20. Provide a high level of customer service.

21. Maintain accurate records.

22. Follow all applicable laws and regulations.

23. Keep the facility clean and well-maintained.

24. Provide a safe and secure environment for all customers.

25. Provide a high level of customer service.

PRELIMINARY FACILITY EVALUATION REPORT

PRELIMINARY FACILITY EVALUATION REPORT

GOALS AND OBJECTIVES

The Fort Union Regional Coal Team, in its consideration of leasing federal coal, will address the likely coal end-uses and their implications. The purpose of evaluating how the coal will be used is to present the most probable major impacts of development.

The end-use facility evaluations are at a reconnaissance level and the reports are presented only as general approximations of facility characteristics and impacts.

The uncertainty of actual end-use facilities and the inherent problems in defining a "typical facility" limit end-use analysis to broad generalizations. The evaluations are not meant in any way to substitute for detailed site specific evaluations, EISs, or analyses which come later when mining and facility projects are actually proposed. The end-use facility evaluations will not preclude any federal, state, local, or private decisions concerning actual end uses, facility siting, or end-use restrictions. The end-use reports are meant only to provide additional information to be used in decisions concerning the leasing of federal coal in the Fort Union Region and should not prejudice any later decisions.

End-use evaluations, referred to as preliminary facility evaluation reports, have been prepared for those tracts for which a new coal-use facility is expected to be built. One of the three proposed end-use facilities has been assigned to those tracts based on expressions of interest, tract size, or existing facilities. The typical facilities to be considered are: a 250 million standard cubic feet per day gasification plant; a 1,000 megawatt electric power generation plant; and an 85,000 barrel per day indirect coal liquefaction plant.

Part I of the report summarizes what the assigned typical end-use facility might be like. The description of the facility gives plant size, process technology, plant requirements (fuel, land, water, power), emissions, and other characteristics of facilities likely to be proposed in the Fort Union Region. The description includes ancillary facilities and a discussion of construction and operational aspects of the facility that are relevant to determining impacts that could occur in the vicinity of the tract.

The facility description is based on existing analyses, studies, environmental impact statements, and consultation with State and industry representatives. Part II of the facility report is an analysis of the facility impacts on the tract area.

The preliminary facility evaluation reports will be used by the Regional Coal Team to rank federal coal tracts with a better understanding of likely future development impacts and implications.

PART I

Assumptions and Variables

The typical electric power facility characteristics are based on numerous assumptions and reasonable values for important variables. Some of the assumptions and variables are based on best estimates. Others are based on existing literature, facilities, and on input from industry sources.

Facility Location, Type, and Size

Because of the economics of lignite coal, it was assumed in the early stages of the Fort Union coal leasing process that the end-use facilities would be near the tracts to be leased. The energy value of lignite coal as well as the water content make the transporting of lignite for long distances uneconomical. For purposes of issue level impact analysis, the electric power facility assigned to the Central Bloomfield tract is not specifically located but assumed to be near the tract. Such an assumption will eliminate the problems of arbitrarily siting facilities. Facilities were sited, however, for the air quality modeling. Where specific site location information was available from potential project developers, it was used in the facility analysis.

The proposed electric power facility will produce 1,000 megawatts (gross) of power. The coal fired electric power plants being constructed or planned in the region generally have from one to three generation units, each producing from 400 to 500 megawatts of power. A facility consisting of two 500 MW units was chosen to be representative of a typical electric power facility.

Construction Period

The construction time span for an electric power facility can vary greatly. A company hiring four to five thousand construction workers could complete the proposed facility in as short a time span as three years. A company could choose to lengthen the construction period or build parts of the plant capacity in two or more construction phases. This would reduce the construction work force and spread construction over as many as ten years.

The assumption is that the typical facility will be constructed in phases. For the two unit electric power plant, the second unit would begin construction in the third year after the first unit is begun. The total construction period would cover approximately eight years.

Employment

The construction work force will be a function primarily of the construction schedule. Work force numbers were supplied by the Basin Electric Power Cooperative. The average yearly employment figures are based on the projected work force for the Antelope Valley Power Plant.

Water Requirements

Water demands for an electric power facility depend on production technology, plant load factor (percent of output capacity), operation time, and water quality. The values used for water requirements are based on estimates from Basin Electric. The value for gallons per minute is an estimate of average water use for the facility. The yearly requirements are an approximation based on an operation factor assumed for the facility. This operation factor indicates the time the facility will be in operation each year. The electric power facility will assume an average load factor since peak power will not be needed full time due to varying load demand.

For analysis purposes, water for the electric power facility is assumed to come from the Yellowstone River.

Emissions

The air emissions for the plant will depend primarily on the facility's production process, the amount and quality of coal burned, and the level of pollution control. An assumption affecting air emissions from a generic facility is the quality of the coal. The sulfur, ash, and water content of the lignite will not only influence emissions per tons of coal burned, but will also determine the amount of coal required for a given facility. The air emissions from any type of coal conversion facility will be a function of the conversion process characteristics and the emission control technology used at the facility and the level of control used.

The impacts resulting from air contaminants emitted by the coal end-use facility are deduced by using established air quality standards above which deleterious effects of the contaminants are implied to occur. A facility's ability to meet air quality standards assumes there would be no significant deleterious effects to human health, animals or vegetation. Such an assumption is the subject of continuing discussion and is disputed by certain research studies. A more detailed discussion of this issue can be found on pages 37-94 in the Final West-Central North Dakota Regional Environmental Impact Study on Energy Development (October 1978). The facilities could also emit certain pollutants for which there are no standards. The anticipated levels of air quality concentrations of contaminants are obtained by measuring existing levels of air quality and adding computer simulation of the atmosphere loading resulting from the end use facility.

The air quality impacts are considered in terms of ambient air standards and prevention of significant deterioration standards. Under authority of the Clean Air Act of 1970, the State of Montana has promulgated its own ambient air quality standards. The purpose of the Montana Ambient Air Quality Standards is to control the quality of the air over Montana such that, a) the health of sensitive and susceptible segments of the population will not be adversely affected; b) concentration of pollutants will not cause public nuisance or annoyances; c) significant damage to animals, ornamental plants, forest and agricultural crops will not occur; d) visibility will not be significantly reduced; e) metals or other materials will not be significantly corroded or damaged; f) fabrics will not be soiled, deteriorated, or have their colors affected; and g) natural scenery will not be obscured. Montana's ambient air standards are generally more stringent than the federal EPA standards, and they include a number of criteria for which there are no EPA standards, such as visibility (Class I areas only), hydrogen sulfide, and fluoride.

Under authority of the Clean Air Act Amendments of 1977, Prevention of Significant Deterioration (PSD) standards apply to all areas that are in compliance with federal standards for particulate matter and sulfur dioxide. PSD establishes three air quality classes. Class I areas allow only a small incremental increase in pollution beyond existing conditions in the area at the time of designation. The bulk of the United States was designated Class II, which allows for well-planned growth and some additional pollution, although within limits that are well below the standards. Class III applies to areas of industrial growth and permits incremental increases in pollution up to, but not exceeding, the standards. Since 1974, Congress, the states and Indian tribes have been eligible to petition EPA to classify areas Class I and Class III, providing that various specified procedures are followed. Wilderness and certain other specially managed areas in existence before August 1977 received automatic Class I designations, and the Northern Cheyenne Tribe requested and received Class I status for its reservation in mid-1977. The federal Clean Air Act states that pollutants originating in Canada are to be included in calculating the existing air quality of neighboring regions of the United States for purposes of enforcing the PSD standards, unless the governor of a state takes action to exclude such pollutants.

After March 1979, the states were to be responsible for administering the PSD regulations and for processing redesignation petitions. However, due to changes in the federal rules, PSD delegation for Montana has not yet been approved. The Air Quality Bureau is presently evaluating procedural alternatives for PSD administration.

An in-depth analysis of air quality impacts resulting from facilities associated with certain coal lease tracts was impossible. Discussion of site specific impacts without addressing the interactive and cumulative

impacts would have little decision value. For the purpose of this analysis, the end use facility which has been assigned to the coal lease tract will be discussed. This discussion will contain general statements regarding facility impacts on the air quality. The impact analysis is based on standard dispersion computer modeling using the worse case situation. The analysis is in terms of compliance or noncompliance with ambient air quality standards or PSD standards. A limited analysis of this type cannot be substituted for a detailed permit review. Care must be taken to use this information with the proper qualifiers and should not be taken out of context.

Solid Wastes

Estimates of solid wastes from the facility are based on figures from Basin Electric. Estimates for ash and sludge could vary considerably depending on the ash content of the coal and the pollution control technology used. Planned facilities are proposing to dispose of solid wastes in the nearby mines.

ELECTRIC POWER FACILITY

Introduction

A typical coal fired steam electric power generation plant will consist of two 500 megawatt (gross) units located near a lignite coal source. The facility with an average operation factor of .90 and a load factor of .85, will be capable of delivering a maximum of approximately 900 MW to the existing transmission system. The facilities for the electric power complex would consist of the following major areas: 1) coal preparation, 2) power generation, 3) pollution control and waste disposal, and 4) pipeline and transmission facilities. See Figure 1.

The total land area dedicated to the electric power generation facility would be approximately 600 acres. The main building at the facility site will house the boiler and turbine units. Other structures at the site will include facilities for coal handling, cooling water, air pollution control, and administration.

Employment

The construction of two electric power generation units is expected to last approximately eight years. The average annual number of workers required for plant construction will peak in the third year of construction when substantial work on both units would be underway. The peak construction work force is expected to be approximately 1,900 workers in the second quarter of the third year. Once in operation, the facility will permanently employ about 200 people.

TABLE 1
AVERAGE YEARLY EMPLOYMENT

Year	1	2	3	4
Construction	309	1138	1248	798
Permanent				36
5	6	7	8	
666	580	682	168	
102	108	108	200	etc.

Source: Basin Electric Power Cooperative for Antelope Valley Station.

Coal Preparation, Storage, and Handling

Lignite coal would be transported from a nearby mine to a three day live storage pile or a sixty day dead storage pile. From the live storage pile, the coal would be sent by conveyor to be crushed before being transferred to the plant silos for intermediate storage. Finally, coal would be conditioned before being introduced into the furnace for ignition. A typical plant would burn an average of approximately 800 tons of coal per hour or about 5.5 million tons per year. See Figure 2.

Power Generation

In a coal fired electric power plant, the crushed coal is combined with air supplied by forced-draft fans and then ignited and burned in the boiler furnaces. The combustion in the boiler furnace produces heat which creates steam from feed water entering the boiler heat exchange system. After releasing energy through expansion in the high pressure section of the turbine, steam is returned to the boiler for reheating. After being reheated, steam is returned to the intermediate section and subsequently to the low pressure section of the turbine. Spent steam passes through the condenser where waste heat is removed, and the condensed liquid is returned to the boiler feed water system. Combustion gases from the furnace are exhausted to the atmosphere through the pollution control devices. Steam energy is converted to mechanical energy by the turbine and subsequently transformed into electrical energy by the generator. Generated power is routed through the main transformer for voltage step-up and then to a switchyard and transmission line system for distribution.

Water System

The water for the power plant systems would come from a nearby river or impounded water source. Raw water would be processed to reduce hardness and alkalinity. The treated water would then be stored for use. Demineralization of the filtered water for boiler makeup will be necessary to provide water of the required quality for the steam generation system. There will be several holding ponds included at the facility to store recoverable water.

TYPICAL ELECTRIC POWER FACILITY

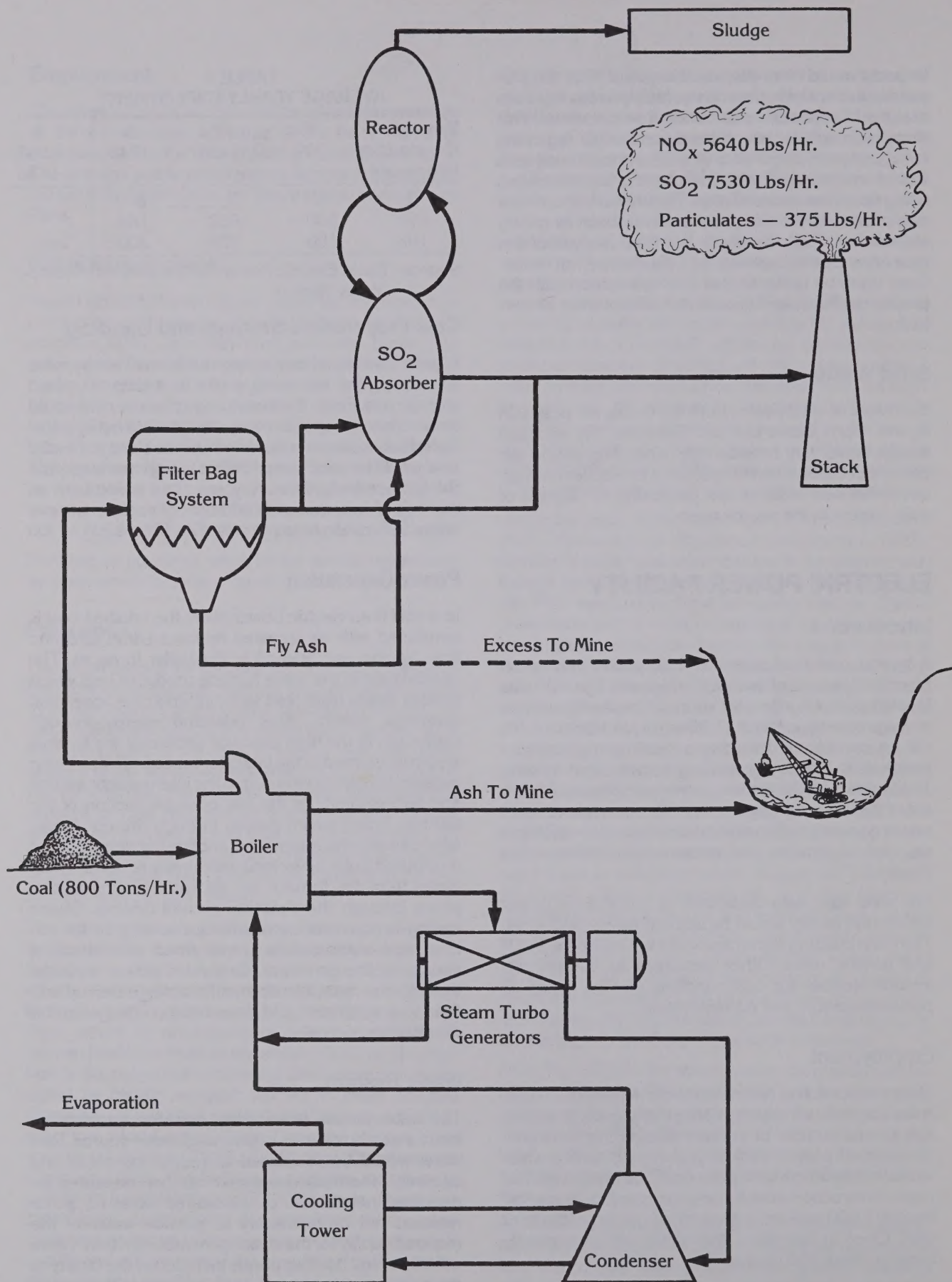
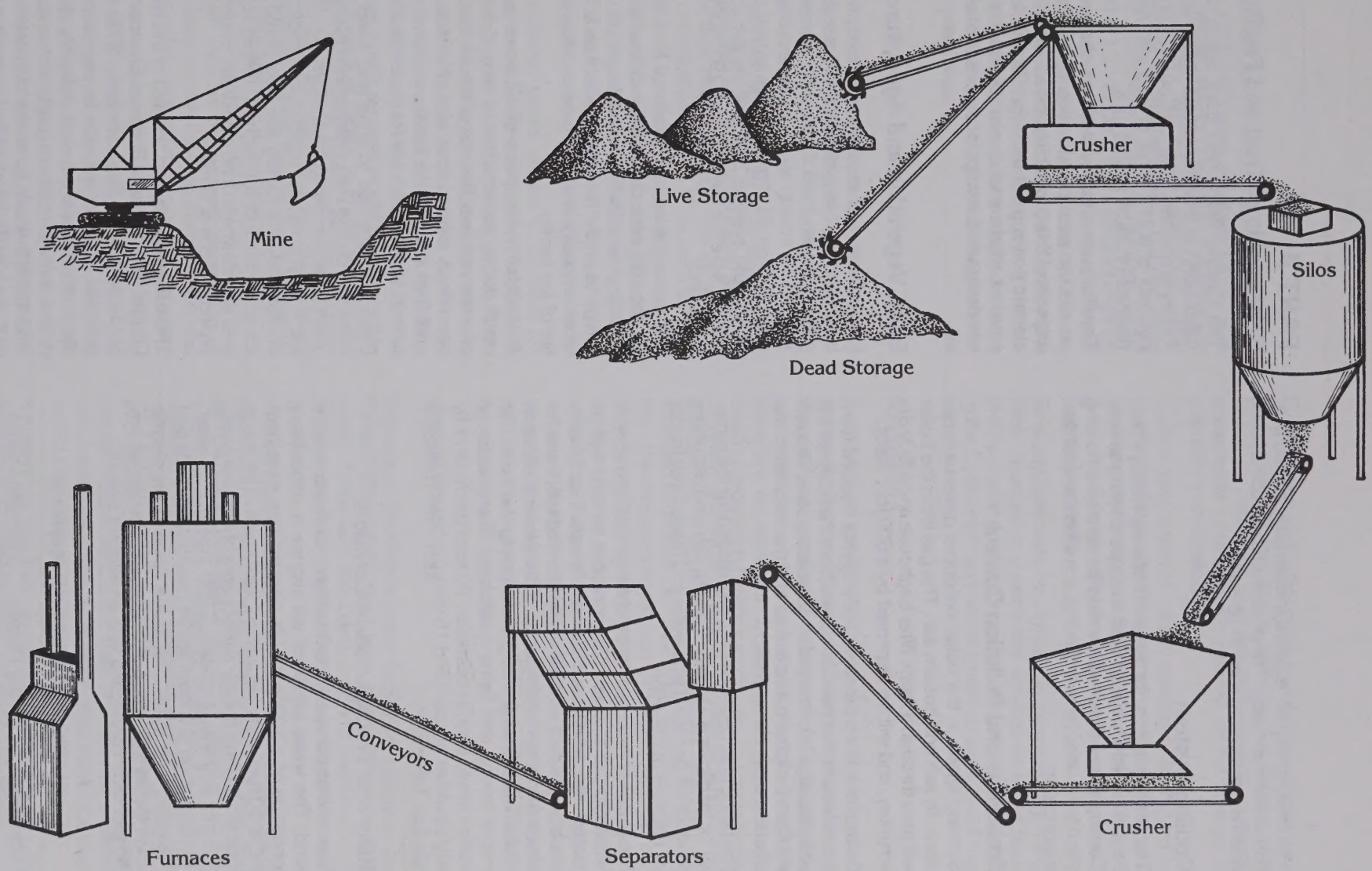


Figure 2

COAL HANDLING SYSTEM



The power plant will require approximately 13,000 acre-feet of water annually. The plant would use about 9,000 gallons per minute when in operation.

Cooling System

The cooling system for the electric power facility would be mechanical induced draft wet-type cooling towers. Cooling tower blowdown would be sent to a holding pond to be used for ash sluicing, scrubbers or coal dust suppression.

Emissions and Pollution Control

Burning lignite in the boiler produces gaseous emissions, fly ash and bottom ash. The gas from the boiler will pass through a fabric filter baghouse and a SO₂ dry scrubber, and will be dispersed by a 600-foot stack.

Bottom ash from the main boiler, pyrite rejected from the pulverizer and ash discharged from the hoppers will be hydraulically conveyed to dewatering bins. The ash will then be loaded into trucks and transported to the adjacent mine for disposal.

The fabric filter baghouse will be installed for the removal of particulate fly ash. The fly ash and scrubber product will be mixed with water and loaded into trucks for disposal in the mine.

The plant will include a dry scrubbing system to absorb SO₂ from the flue gas. The scrubber product will be treated prior to disposal with dry fly ash. The fly ash/scrubber product would likely be blended with water for dust control and stabilization. Emission of nitrogen oxides will be controlled by designing the boiler for proper mixing and flame quenching. The quantity of wastes would be approximately 80 tons per hour of fly ash/scrubber product and 10 tons per hour of bottom ash. See Table 2.

Utility and Transportation Corridors

Water will be pumped from the water source to a surge pond. The water pipelines will require a right-of-way consisting of a 100-foot wide construction easement and a 50-foot wide permanent easement. The surge pond would have a water surface area of approximately 42 acres and would contain 1,050 acre feet of water. Transportation corridors will be required for roads and a railspur. The transmission line leaving an electric power facility would be a 500 KV line with a right-of-way 150 feet wide connecting with an existing system.

TABLE 2
GASEOUS EMISSIONS (lbs/hr)

Particulates	Sulfur Dioxide	Nitrogen Oxides
375	7530	5640

Source: North Dakota Department of Health.

PART II

Relationship of Tract and Facility

The Central Bloomfield tract lies approximately six miles north of Bloomfield and eight miles southeast of Richey in northern Dawson County, Montana. The tract consists of 8,212 acres of land with recoverable coal reserves of 260.6 million tons.

The likely use of coal mined from the tract would be for an electric power generation plant. To consider the impacts of this coal facility, it is assumed that the typical electric power plant described in Part I would be constructed adjacent to or near the tract with no specific site designated, except for purposes of air quality analysis.

Soils, Vegetation and Agriculture

In the Central Bloomfield tract area, the agricultural land consists of approximately 70 percent cropland, 2 percent hayland and 28 percent rangeland. Based on 1978-1979 county averages determined from ASCS data and from BLM grazing files annual production per acre would average 28.4 bushels per acre of wheat, 1 ton per acre for hayland and .195 AUMs per acre for rangeland.

Assuming the same agricultural land use distribution for the 600 acre disturbance estimated for a generic electric power facility, annual agriculture production foregone on the facility site would be 8,520 bushels of wheat annually, in a worst case situation analysis, for the life of the facility.

A short-term disruption of 12 acres per mile would result during construction of an undetermined length of water pipeline. Roadways would disturb 14.5 acres per mile. A railroad spur, also of undetermined length until final siting of the facility would eliminate agriculture on 18 acres per mile for the entire life of the facility.

Erosion losses due to wind and water from ground disturbed during the construction phase of the facility, given State permitting stipulations, would not be significant. Regionally, the agricultural production foregone on the 600 acre facility site also would not be significant. Because of the highly-buffered soils in the tract area and downwind, no significant impacts to soils are expected from acid rains.

There is evidence documented in the literature (West-Central North Dakota Regional Environmental Impact Study on Energy Development, 1978) that there are potential negative impacts to vegetation and to livestock downwind from such a facility due to nitrogen oxides, sulfur dioxide and particulate matter. Such negative impacts would be analyzed in detail at such a time as more specific information becomes available in conjunction with facility permit application with the State permitting authority.

Water

Water requirements for an electric power facility are approximately 9,000 gallons per minute or 13,000 acre feet per year. The likely source of water for industrial use is the Yellowstone River. Water requirements of 9,000 gpm are equivalent to approximately 20.0 cfs. Mean discharge of the Yellowstone at Sidney, Montana, for 67 years of record is 13,140 cfs. Minimum discharge for the period of record is 470 cfs. Withdrawal of water would have no significant impact upon the river. Facility wastes of ash, sludge and water disposed of in the mine do have the potential to degrade water quality if they are disposed of within the saturated zone which develops upon reclamation. Present regulations require state approval of disposal sites.

Land Use

Changes in land use include displacement of existing use, increased intensity of existing uses and the introduction of new uses. The site of the facility is likely to displace agricultural use.

The optimum site conditions for facilities are the same as for agriculture, that is: gentle topography and soils with good drainage characteristics. The increase in population of communities results in demand for new housing, additional commercial development and expanded public use facilities. The area of this development will likely be on off-site agricultural land. The on-site displacement of agricultural land use is discussed in the Agriculture section of this report.

Increased population would create a demand for community services as addressed in the Economics and Social Conditions section of this report. This demand implies a need to expand existing facilities and commercial establishments or to create new ones. Existing commercial establishments may suffer through the construction of new facilities outside the downtown areas. Public services would be stretched in the short term by lack of capital to implement change due to increased population. Parking shortages, traffic congestion and excessive wear and tear on roadways would make downtown areas less habitable. Municipal organizational structures and physical space may prove inadequate with increased population. For example: a part time mayor may be overworked, processing of permits may delay private building construction and filing space for public records may prove inadequate.

With the influx of workers and their families, a change in the composition of the community is inevitable and demands for new forms of public and commercial facilities for shopping, recreation, entertainment would ensue. These types of changes are likely to result in dissatisfaction by both the existing resident population and by the newcomers. Conflicts are likely to occur as a result of the contrast in the lifestyles of these populations.

Existing planning varies considerably from community to community. Some are prepared for change pre-saged by recent oil and gas development in some areas, while others are ill-prepared for the change in population anticipated.

Current perception of county residents with regard to roads, retail opportunities, recreational/entertainment facilities and housing are discussed in detail in Chapter 2 of the Site-Specific Analysis for Economics and Social Conditions.

Similarly, forecasts by city/county planners regarding likely changes in community services resulting from facility related population growth are presented in detail in the Economics and Social Conditions section of this report.

Recreation

Recreation in the tract vicinity is limited to dispersed seasonal big game hunting with white-tailed deer being the predominant species harvested. Access depends on landowner consent and climatic factors. Although there are no recreation facilities in the tract vicinity, existing recreation facilities in the region (community camping and picnic areas, Fort Peck Reservoir, and Charles M. Russell National Wildlife Refuge) are expected to receive the majority of recreation demand from the projected population increase. The social attitude survey revealed a concern for existing recreation facilities. It was stated that an increase in population would hopefully result in the possible upgrading of already marginal recreation facilities. This concern will be addressed with the expected recreation demand from increased population in the regional EIS. There is no wilderness in the area.

Wildlife/Fisheries

Impacts of an electric power facility on wildlife in the Central Bloomfield tract area could occur in two areas: 1) impacts from destruction of habitat and 2) direct and indirect impacts from the increase in human population.

The removal of vegetation for a 600 acre electric power facility and the expansion of urban areas, highways, and railroads would prevent or reduce the use of an area by wildlife regardless of the type of vegetation removed. All significant wildlife values cannot be assessed until wildlife inventories on and around the tract are completed in October, 1981. It is known that essential mule deer habitat occurs west of the tract and valuable whitetail deer habitat lies south. A facility located east of the tract would likely reduce the potential impacts to wildlife.

If powerlines, pipelines, access and haul roads are constructed in key wildlife areas, partial or total destruction of habitat would occur depending on the magnitude of development. The worst case would destroy present

wildlife populations in the area. Wildlife oriented recreation such as hunting and wildlife observation would have to be sought elsewhere. Wildlife would be impacted by eagle electrocutions on powerlines, migratory bird mortality from striking powerlines close to wetlands, road kills along transportation routes through important wildlife areas, harassment of wildlife by off-road vehicle use, increased poaching, as well as habitat destruction.

Poaching and road kills have increased dramatically in areas of North Dakota, Montana, Wyoming and Colorado where energy development has occurred. The problem is compounded in areas where transportation corridors are located in important wildlife areas and shift changes coincide with wildlife feeding periods. This situation could occur in the Central Bloomfield tract area.

The impact to wildlife could be mitigated by: 1) siting the electric power plant and associated facilities with regard for critical wildlife areas, 2) adjusting work shifts to avoid feeding times of highly visible wildlife, 3) mass transportation of employees, 4) providing funds to State fish and game agencies to better control illegal shooting of wildlife, and 5) adopting a poaching clause in union contracts.

The amount of water withdrawn from the Yellowstone River for an electric power facility with off channel storage is not considered significant enough to affect fisheries.

The cumulative increases in industrial, urban and other water uses will dictate the severity of the impacts on fisheries. The cumulative impact will be addressed in the regional EIS to be prepared.

Cultural Resources

The Central Bloomfield tract area has not been inventoried to date. Information from existing inventories (BLM unpublished data, Davis 1976; Greiser 1980) outside the Fort Union coal region suggests that the predominant prehistoric sites should be lithic scatters of varying size, density and function (ca. 70-80%). Other expected prehistoric resources include stone circles (ca. 10%-20%), ceramic bearing sites, rockshelters and kill sites (ca. 10% combined). Expected historic resources include homestead and ranching remains (ca. 50%), historic graffiti and rock art (ca. 20%), freight roads, dugouts, cairns, trading pots, burials and battle sites (ca. 30% combined). Further information on cultural resource occurrence, distribution and significance cannot be quantified prior to inventory.

Visual Impacts

Eastern Montana has very high but common visual quality. In the absence of other types of visual experiences, the landscape is not highly valued as scenery

because of the vast distances involved in crossing this relatively uniform area. Most highways roll with the landform so views alternate between nearby features at low points and panoramas of up to thirty miles at high points in the roadway profile. The landscape is seen in terms of these short vistas of landscape elements that will not be seen again, and short duration views of distant landscapes in which any vertical object or landscape feature serves as a focal point.

Large structural features in the Eastern Montana landscape contrast with the landscape both in terms of the visual surface (the character of what is seen) and in terms of function. Vertical and linear components of a facility, because of hard architectural edges of the structures, and the transitory nature of panoramic views imply a visual importance of these large objects for orientation. The aesthetic response is secondary to this visual function.

Neglecting cultural bias, the aesthetic response to stark architectural lines and pure planes of color contrasting with the simple curvilinear landforms of the countryside can be considered positive. This visual experience would be immediately comprehensible and would provide relief from a relatively uniform countryside. Beyond this initial response, however, are responses with origins in cultural bias and the individuals' relationships to the land. The greatest effect would be upon local residents with memories of the existing landscape to use as a comparative basis of judgment. If no attachment to the existing landscape is present, the facility would be judged more on its quality than on cultural bias.

The visual impact would be the penetration of the skyline by the facility in views from communities and major transportation corridors. The 600-foot stack could potentially be seen thirty or more miles away. Powerlines originating at the site would have more extensive consequences and consideration for corridor planning related to the placement of facilities is essential to maintain visual quality in the region. The facility would be highly visible and would demand a response either positive or negative. The dominance of the facility in the landscape could be perceived as a loss of amenity through impairment of the landscape as it now exists for the forty years of the facility's expected life.

Economics and Social Conditions

Construction and operation of the Central Bloomfield Facility would result in impacts upon services in some communities within the areas as a result of population growth associated with employment opportunities. Figure 3 shows forecasted community employment and population levels through the year 2000 both with and without development of the facility. As these figures show, Sidney, Circle, Fairview, Lambert, and Savage would experience increases in both population and employment as the result of development.

FIGURE 3

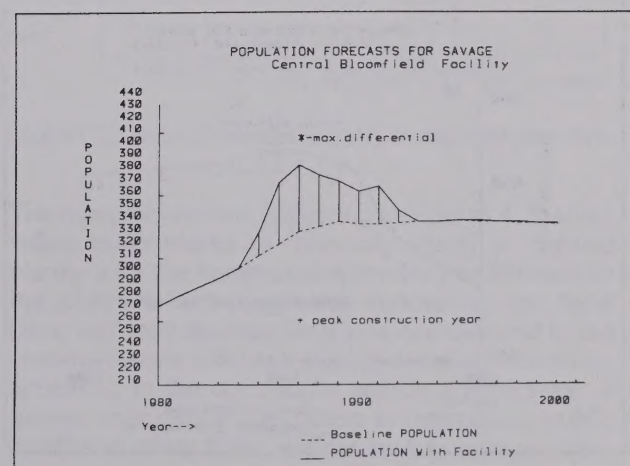
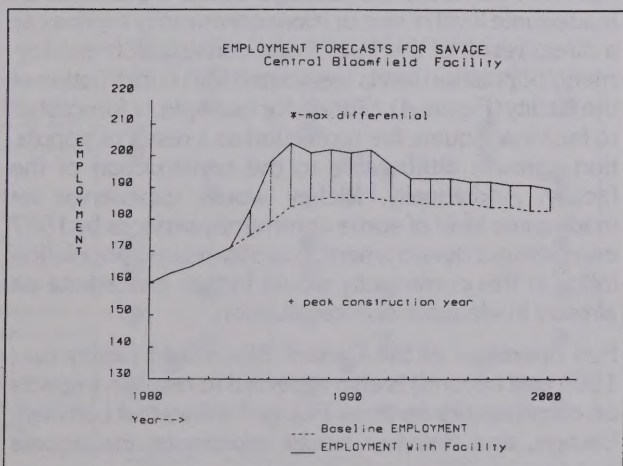
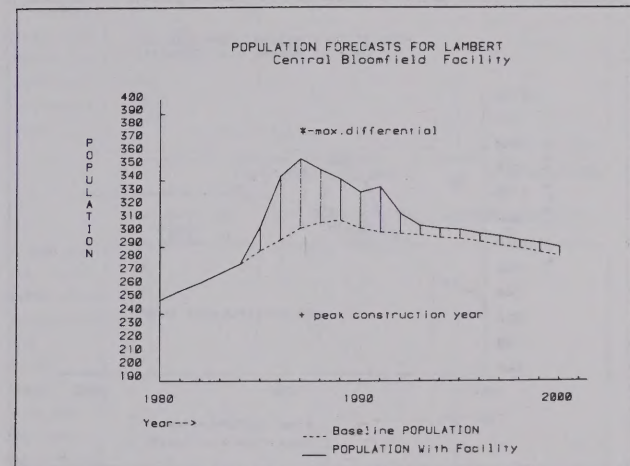
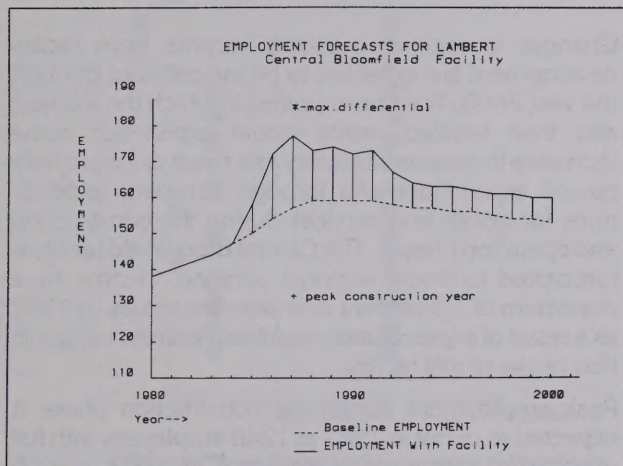
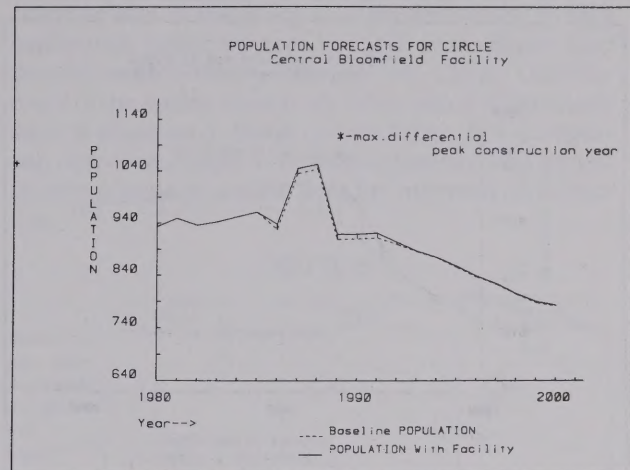
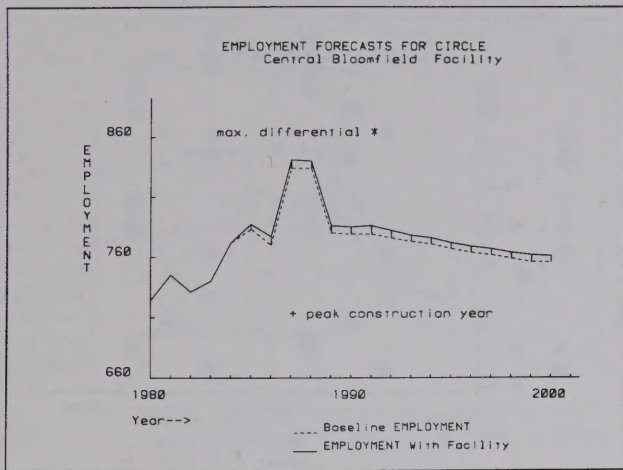
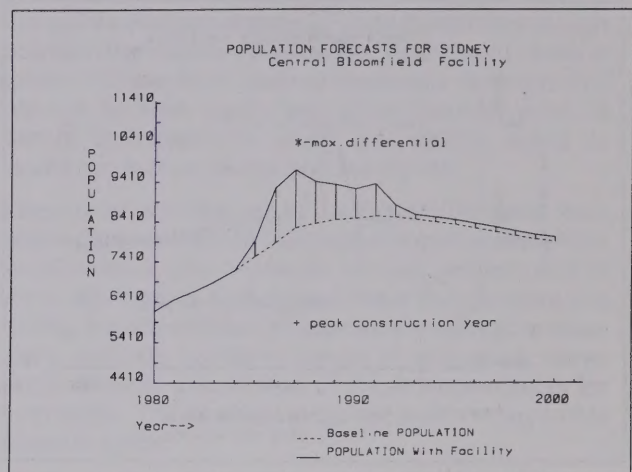
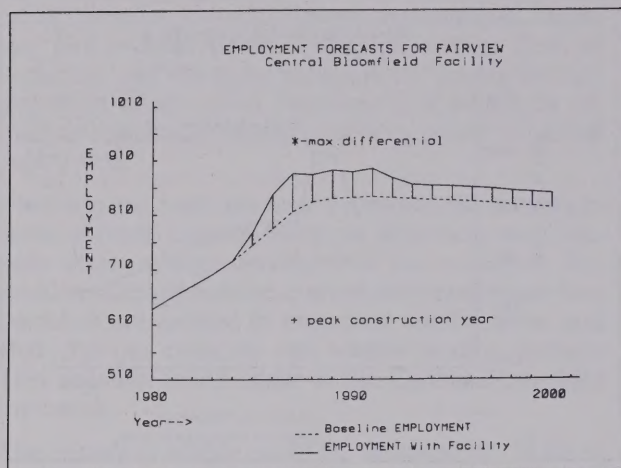
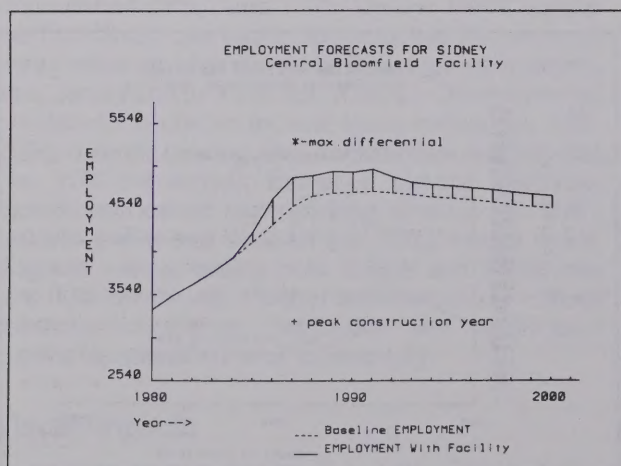
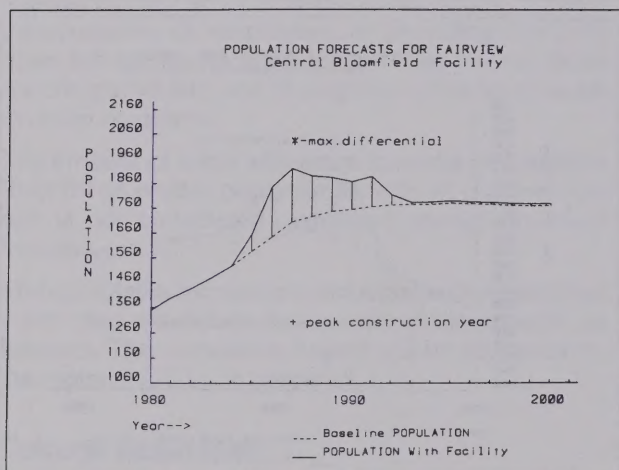


FIGURE 3 (continued)



SOURCE: Mountain West Research, Inc., 1981.

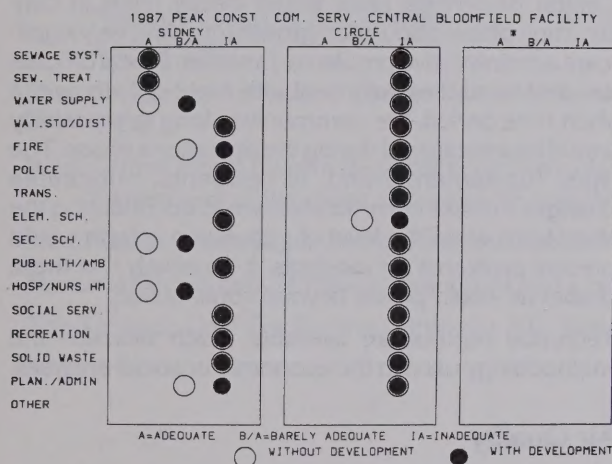
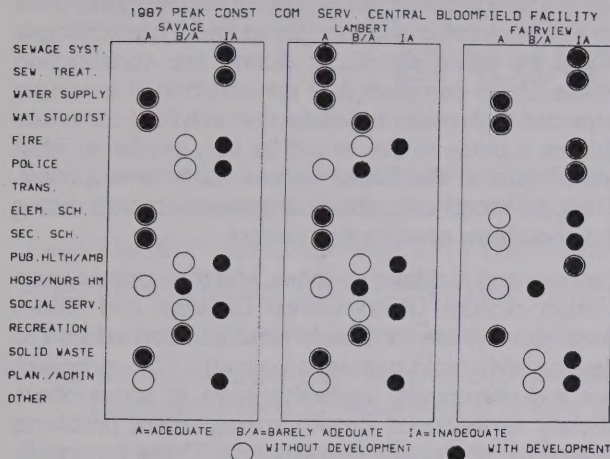


Changes in regional personal income from facility development are expected to be insignificant through the year 2000. The communities in which the workers and their families reside would experience some increases in economic activity as a result of employee's payroll expenditure and through company expenditures for goods and services during the construction and operation phases. The Central Bloomfield facility is forecasted to boost regional personal income by a maximum of 1.3 percent over baseline values by 1987 as a result of expenditures associated with the construction phase of this facility.

Peak employment during the construction phase is expected to occur in 1987 at 1248 employees with full operations employment expected in 1993 at 200 employees. Using 1987 as the first primary impact date, it is estimated that the communities of Sidney, Circle, Fairview, Lambert, and Savage would experience an inadequate level of one or more community services as a direct result of the 1987 peak construction employment/population levels associated with construction of the facility (Figure 4). Sidney, for example, is forecasted to face inadequate fire protection as a result of population growth attributable to the construction of the facility. Additionally, Richey would experience an inadequate level of some community services by 1987 even without development. A facility-related population influx in this community would further exacerbate an already inadequate service situation.

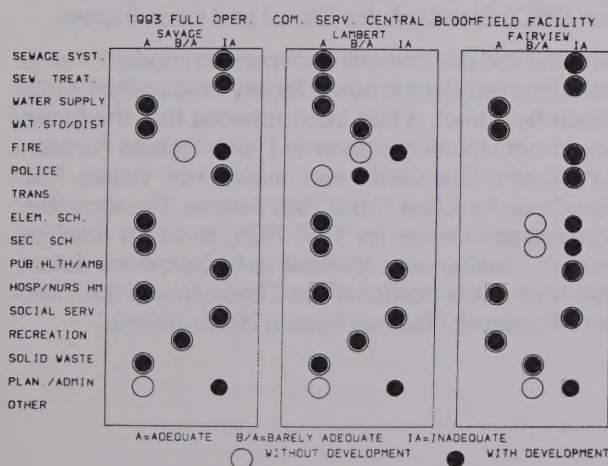
Full operation of the Central Bloomfield facility (i.e., 1993 and beyond) is also expected to result in impacts on communities services. Figure 5 shows that Lambert, Savage, and Fairview would experience inadequate

FIGURE 4



SOURCE: Respective city/county or regional planners.

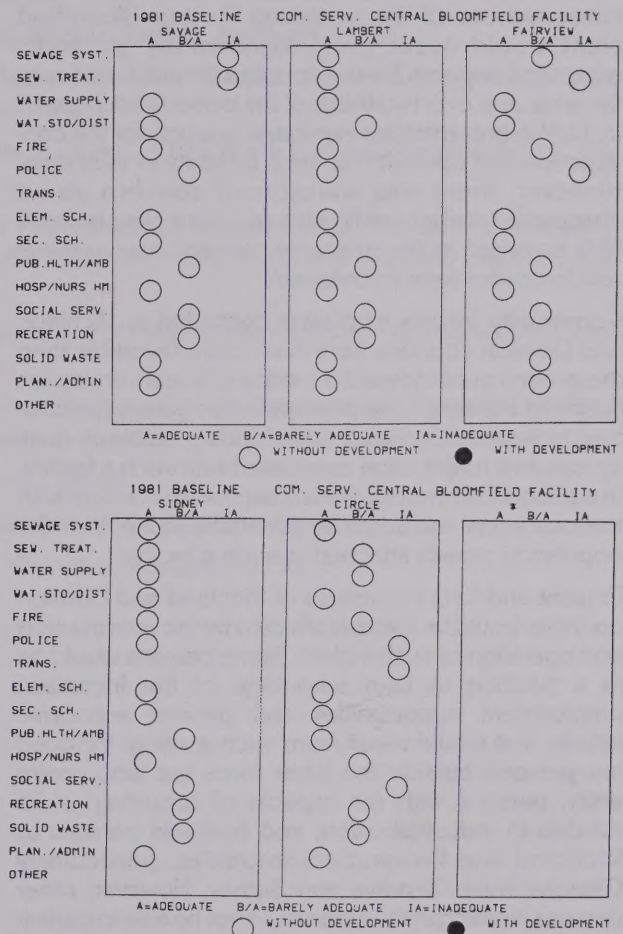
FIGURE 5



SOURCE: Respective city/county or regional planners.

services as a direct result of the population influx resulting from facility operation. Additionally, the following communities in the study area are forecasted to face inadequate public services by 1991 even without tract development: Sidney, Richey, and Circle. Development of the facility would further worsen an inadequate service situation in these communities. For comparison purposes, Figure 6 shows the current (1981) public service adequacy assessments for impacted communities.

FIGURE 6



SOURCE: Respective city/county or regional planners.

The adequacy ratings appearing in Figures 4, 5, and 6 reflect assessments by either city-county or regional planners for the communities involved and constitute the planners best judgments concerning the fiscal (revenue/cost) situation likely to be encountered by the communities in 1987 and 1993. Several of the services appearing in the community service graphics are of greater importance than others in maintaining public health and safety. Basic services such as sewage collection and treatment, water supply and water storage/distribution, health care and police/fire protection are of more immediate concern to community well-being

than are nonbasic services such as recreation facilities and libraries. Consequently, communities which experience impacts to these basic services would undergo somewhat greater difficulties than would a community which experiences impacts on its nonbasic services. Additionally, inadequacy of basic services (water and sewage systems especially) can be difficult for a community to deal with because of the relatively large capital expenditures required for upgrading these types of services.

Residents in Richland and Dawson counties, where the consequences of the proposed Central Bloomfield plant would occur most significantly generally expressed support for the construction of facilities in the area. Just over two-thirds of the persons interviewed by BLM representatives expressed support for the construction and operation of such a facility in their area. However, there was widespread concern about changes in local air quality should such a plant be built. This emerged as the strongest concern among those residents who were interviewed.

Community leaders who were contacted in Richland and Dawson counties were even more favorable than the general public toward the siting of a coal conversion facility in the area. Like persons in the general population, however, these leaders identified possible air quality loss as a major issue associated with such a facility. In addition, community leaders expressed concern with the local social and administrative consequences of the population growth attached to such a facility.

Present and future residents of Richland and Dawson counties would be variably affected by the construction and operation of such a plant. Some persons would be in a position to take advantage of the increased employment opportunities and general economic activity that would result from such a siting. Included are persons outside the labor force but who desire entry, persons with (or capable of acquiring) skills needed in industrialization, and business persons in Richland and Dawson communities, particularly Glendive-West Glendive and Sidney. However, other persons residing in the area would not be able to participate in the economic benefits. These persons would thus bear the consequences (increased traffic, crowding, impersonalization, and potential rowdiness) of rapid growth that would be most evident during the short-term, construction period.

The best thing about living in Dawson and Richland counties, according to many of those persons contacted by BLM, is the small town, informal, quiet social

atmosphere that presently exists. Construction of the Central Bloomfield Facility would result in this social atmosphere being substantially altered. These changes would be most significant during the construction phase. Upon completion of construction, it would be expected that residents satisfaction with their communities as a place to live would be very similar to what would exist in the future without such development. Thus, the most noticeable changes would occur during the short-term construction period.

Dawson and Richland counties, and their primary population centers, Glendive-West Glendive and Sidney (respectively) are in a fairly solid position relative to dealing with rapid population growth. The communities and community leadership have, to some extent, already experienced growth management problems related to oil and gas development. These communities are relatively large in population and fairly diverse, both economically and socially. Construction of the Central Bloomfield plant would clearly result in construction phase population growth involving very significant administrative problems. However, if local officials are able to successfully deal with rapid growth over a short time period, the communities long term stability would be established during the operations phase. The most fundamental and, to residents, noticeable changes in these communities would occur during the short-term when the level of population growth would present problems for residents. It is unlikely that these problems would persist beyond construction.

Technical reports are available which describe the methodology used in the economic or social analyses.

Air Quality

The introductory section on assumptions and variables discussed the air quality analysis conducted for the facilities. The result of the analysis is a determination of compliance or noncompliance with Ambient Air Quality Standards and Prevention of Significant Deterioration (PSD) Standards for Class I and Class II areas.

With the use of a screening dispersion model for emissions from an electric power facility sited on the Central Bloomfield tract, it has been forecast that the facility would not violate Montana or North Dakota Ambient Air Quality Standards and would not violate PSD Standards for Class I and Class II areas. The increased concentration levels for TSP, NO_x, and SO₂ resulting from the facility were forecast to be below the detectable level at the border of the Class I area of the Theodore Roosevelt National Park in North Dakota.

LIST OF SOURCES FOR THE PRELIMINARY FACILITY EVALUATION REPORTS

- ITAT Construction Work Force Report for February 1981; Inter-Industry Technical Assistance Team, Basin Electric Power Cooperative, Bismarck, North Dakota.
- Basin Electric Power Cooperative; 1717 East Interstate Avenue, Bismarck, North Dakota 59501.
- The Nokota Company; Suite 112, Provident Life Building, Bismarck, North Dakota 58501.
- The American Natural Resources Company, 1 Woodward Avenue, Detroit, Michigan 48226.
- Final Environmental Impact Statement for the Great Plains Gasification Project, Mercer County, North Dakota. Prepared by the U.S. Department of Energy. August 1980.
- Environmental Assessment of a Coal Gasification Complex in Dunn County, North Dakota. Prepared by the Natural Gas Pipeline Company of America.
- Identification of Synthetic Fuel Impacts: A Preliminary Assessment. Prepared for the Montana Department of Natural Resources and Conservation by teams at the University of Montana and Montana State University. August 1980.
- Montana Energy Almanac. Prepared by the Montana Department of Natural Resources and Conservation. October 1980.
- West-Central North Dakota Regional Environmental Impact Study on Energy Development. Prepared by the U.S. Department of the Interior, Bureau of Land Management and the State of North Dakota. October 1978.
- North Dakota State Department of Health; Bismarck, North Dakota.
- Montana Department of Natural Resources and Conservation; Helena, Montana.
- The Tenneco Coal Gasification Company; P.O. Box 491, Glendive, Montana 59330.

**BLM Library
Denver Federal Center
Bldg. 85, OC-521
P.O. Box 25047
Denver, CO 80225**

